Alternative Grain Handling Systems

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Pivotal Plus
Consulting Ltd.

Executive Summary

Currently, there are a number of different producer track loading systems in operation. They vary from the basic technique of augering grain directly from the truck to the hopper car to the most sophisticated with substantial storage space and cleaning capabilities.

The demonstration track loading systems considered also cover this wide range of facilities. Based on analysis which not only provided specifications of system components and their costs but also estimates of the operating costs, the track loading systems had cost ranges from $1.26/tonne to $3.95/tonne for self-administered cars and $2.68/tonne to $5.37/tonne for company administered cars. This compared favourably to the maximum elevator tariff of $10.75/tonne for 1994/95.

When one takes into account potential revenue from cleaning grain and incentive rates from loading eighteen or more hopper cars within an eight hour period, the mini-elevator with the capability of loading three hopper cars per hour is the most economical. Reducing the costs per tonne by the incentive rate of $1.75/tonne for twenty or more cars results in the net cost per tonne being $1.14 for a self-administered car and $2.56 for a company administered car for a low volume (450 hopper cars per year) scenario. Under the medium volume (1,000 hopper cars per year) scenario, the results are $0.04/tonne for a self-administered car and $1.47/tonne for a company administered car. For a high throughput (2,500 hopper cars per year) scenario, the self-administered car would generate a net profit of $0.49/tonne while the company administered car would cost $0.93/tonne. Even the low volume scenario with incentive rates is below the cost of a site with a basic permanent auger.

When selecting a location to establish a track loading system, the most important factor to consider is the size of the car spot and the potential for expansion of the

facility and the track siding. Deregulation of the rail system will necessitate capitalizing on all available cost reductions.

The report also summarizes the capital and operating costs for mobile elevator units. Currently, there are two prototype units in use. The UGG unit is self-contained, transporting the semi-trailer with the tractor to load grain directly at the farm site. The prairie Pool unit requires that a semi-truck accompany the unit to the farm yard for loading. The costs of these units assuming full-time staffing and an annual volume of 40 000 tonnes are $2.57/tonne for the UGG unit and $5.39/tonne (including $3.00/tonne for custom trucking) for the prairie Pool unit. With a volume of 80 000 tonnes, these costs would be $1.28/tonne for the UGG unit and $4.19/tonne for the Pool unit (with custom trucking). It has been estimated that the farmer incurs operating and capital costs between $5.00 and $5.50/tonne for trucking his grain from the farm to the elevator. In addition, the producer can pay up to $10.75/tonne for wheat to use the primary elevator system. Considering these costs, the mobile elevator unit compares favourable relative to the traditional primary elevator. These mobile elevators will allow the producer to direct sell his grain to end users such as crushers and feed mills. Grain companies can also use these units to market other services such as seed, fertilizer or chemical sales.

One should expect significant changes in the commercial and policy environment over the next few years with the elimination of the Western Grain Transportation Act and the lifting of prohibition orders on branchlines. These changes will mean a revised rail network, higher freight rates and production of more specialty crops. This new environment will have to be accounted for when selecting where to locate a track loading system or a mobile elevator unit. Flexibility and adaptability will be the keys to a successful operation.

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Chapter 1

The Grain Handling and Transportation System

I. The Regulatory Institutions

The Canadian grain handling and transportation system operates in a highly regulated environment involving many individuals, companies, crown agencies and federal government departments.

The major institutions involved in the system include:

- the **Canadian Wheat Board (CWB)** which markets wheat (including durum) and barley directly to international buyers and to domestic users of these grains for human consumption. The Board administers a quota system to regulate the quantity and quality of grain delivered from farms. The CWB takes into account its sales commitments when determining the required quotas. This quota system ensures each producer has an equal opportunity to sell his grain. It also reduces terminal congestion at the port by assisting in the timely shipment of the appropriate grades/grains to the port. Quotas are announced throughout the crop year. They are stated in terms of the number of tonnes per assigned quota acre for each grain. Over the past two years, the CWB has been replacing its quota system with a contract delivery system.

  The delivery policy for the 1994/95 crop year can be summarized as follows:

  (a) from the start of the crop year until after harvest, each permit bookholder will be entitled to a delivery minimum of 30 tonnes for each grain (wheat, durum and feed barley).

  (b) after determining the available tonnes and the estimated grade, a producer would sign a delivery contract with the Board.

Authorizations for delivery are based on a percentage of the tonnage contracted. The Board will adjust this percentage depending on sales opportunities.

(c) the Board has a performance clause in the contract. If deliveries fall below 85% of the contracted tonnage, a penalty of $6/tonne for any shortfall up to the 85% level would be applied.

(d) the Board can proportionately reduce the contracts if the market demands are less than the volumes contracted. Should this occur, the producer can opt out of his contract without a penalty.

Upon delivery to the elevator, the grain is weighed, graded and moved into storage. The producer is then issued an initial payment. This initial payment is set by the CWB at the beginning of the crop year and is based on a percentage of the anticipated returns for the crop year. It can be adjusted upwards throughout the crop year. However, the initial price cannot be reduced. For this reason, there is a tendency to be conservative when estimating market returns. At the end of each crop year, the Board deducts its marketing costs and, if able, makes a final payment to producers.

The CWB is also responsible for the allocation of rail cars among provinces and among the grain companies. The number of grain cars available to move grain is determined by the Grain Transportation Agency (GTA) and the railways. The GTA then splits these cars between Board and non-Board grains. The CWB is responsible for allocating the Board grain cars to the various areas on the prairies and to the companies.

- the **Grain Transportation Agency (GTA)** establishes and monitors system performance, allocates rail cars (Board versus non-Board), forecasts grain movement for the purposes of rate setting under the Western Grain Transportation Act (WGTA) and coordinates the activities involved in the movement of grain. The GTA also administers the federal

government fleet of hopper cars.

- the **National Transportation Agency (NTA)** monitors the costs of the railways and sets the rates for the movement of grain. It undertakes a detailed review of railway costs every four years. The last costing review was based on costs incurred in 1992. The NTA also is responsible for hearing applications for the abandonment of rail lines. Currently the prairie rail network is protected from abandonment until the year 2000. Since 1983, there has been an annual average of 100 miles of lines abandoned. This will change dramatically under WGTA reform.

- the **Canadian Grain Commission (CGC)** is responsible for setting standards for grain. This includes the development, identification and registration of grain varieties. The CGC inspects, weighs and grades outbound grain from inland terminals, grain unloaded from rail cars at the port terminals and grain loaded into vessels. The CGC certifies the export shipments for weight and grade through issuance of the Certificate Final. The CGC also allocates producer cars for direct loading within the car allocation system, certifies scales and licenses elevators. These responsibilities would impact operations involving producer track loading systems and mini-elevators.

  Until recently the CGC set the maximum tariffs for primary elevators, inland terminals and terminal elevators. Amendments to the Canada Grain Act have recently removed the requirement for the CGC to fix maximum elevator charges and the requirement for elevator companies to give advance notice of changes in their charges. To ensure that the rates charged are reasonable, the CGC will retain the power to reimpose regulated maximum elevation charges. For a two-year transition period, the CGC can establish maximums if the investigation of a complaint finds that a particular tariff is unjustified. The CGC will also have the power to set maximums if the elevator operators set tariffs at excessive levels.

These revisions will give the grain companies more flexibility in charging different rates at different locations. The federal government hopes that elimination of the maximums will encourage more capital investment and provide incentives to expand terminal capacity at the west coast.

II. The Primary Elevator System

Grain moves from the farms of 125,000 permit book holders into the 1,409 primary elevators located at 958 delivery stations across the prairies. These primary elevators have a total storage capacity of 6.7 million tonnes with an additional 0.3 million tonne storage at two inland terminals. In total, the system handles about 32 million tonnes, representing a turnover rate of 4 to 5 times.

The elevator system has rationalized over the last twenty years. In 1971, the number of licensed elevators stood at 4,848 with a storage capacity of 11.2 million tonnes. Since 1984, the system has been reduced by over 500 elevators. It is estimated that by 2005 there will be only 800 to 850 elevators with turnover rates in excess of 10 times per year. New primary elevators are being designed with storage capacity of 10 000 to 30 000 tonnes and turnover rates of over 15 times per year. Industry sources anticipated that by 2005 there will be an additional 25 to 30 high throughput facilities added to the grain handling network.

Turnover is the key indicator of elevator efficiency. A study by the Canadian Grain Commission (*"Potential Cost Reductions from Primary Elevator Closures"* by T. Askin, R. Niemi and A. Bourget, 1991) concluded that elevator system total costs decrease as elevators are closed. About one-half of the costs saved are transferred to other elevators handling the increased volumes. The impact on individual grain companies depends on company location, customer loyalty and throughput capacity of alternate points. Recent work by Alberta Agriculture has suggested a similar impact: elevators with a turnover ratio of 5.25 had approximately one-half the operating costs per tonne of those with a

turnover ratio of 2.25. (This calculation does not take into account depreciation which may be of more importance in higher turnover facilities which are usually newer.)

Indexing the CGC cost model to 1992-93 yields an average operating cost per tonne of $5.35 based on 31.8 million tonnes and a total operating cost of $170.1 million (excluding depreciation and head office costs). The average capacity would be 4 814 tonnes yielding a turnover average of 4.62.

Substantial economies of scale have been achieved through consolidation of the primary elevator system. These consolidations will continue to take place. A major problem is that the rationalization is taking place without any knowledge of the future railway network configuration.

KPMG is currently undertaking a project for the major grain companies (to be completed by April, 1995). They have consulted with the various government agencies and railways to identify possible branchline closures. Their analysis estimates that there will be 1,593.4 miles of light density, high-cost lines and 2,081.2 miles of light steel lines subject to abandonment in Saskatchewan by the year 2005. These lines have in total 1 380 160 tonnes of storage capacity and have had average deliveries over the last ten years of 5 903 300 tonnes of grain.

Most of the primary elevators have restricted lengths of rail sidings and limited storage capacity which result in only a few rail cars being loaded at a time. A sub-committee of the Senior Grain Transportation Committee undertook a study of the costs associated with small blocks of rail cars placed for loading grain. Based on information for CN and CP for crop year 1990-91, the average block size was 6.1 cars. About 40% of the blocks had eleven cars or more. The sub-committee concluded that the elimination of small car blocks (three cars and less) would reduce locomotive fuel costs $12 to $46/car for total savings between $0.5 million and $2.0 million. Problems were also related to overloading of cars. The railway has over time noted that producers and dealers have more difficulty

estimating load capacity due to variations in loading equipment and infrequency of loading. Proper loading of the car so that the weight is evenly distributed is as important as putting the correct amount of grain in the car. Each compartment should be loaded to the same level. For this reason, the railways test scale about 12% of producer and dealer cars compared to 5.5% of all elevator cars. The railways estimate the cost of this additional scaling to be about $278,000. Finally, this report identified problems associated with late releases of cars by shippers. Farmers who load self-administered cars are responsible for "releasing" the car once it is loaded. When your "release" your car, you provide information on commodity, origin station, destination and consignee. Producers using a grain dealer or grain company to administer their car(s)must also provide the information to the dealer or company once he has loaded his car(s). Costs related to delays in releasing the cars were estimated to be up to $1,159,000 annually. Over time and given increased use of producer cars at track loading sites, the railways will push for increased efficiencies by reducing the number of small car sidings and using the remaining sites to the maximum extent possible, insisting that producers and dealers use scales when loading cars, and assessing penalties for delays in the shipper providing the correct car release information at the switching yard.

As noted earlier, the complexity of the grading system results in a smaller quantity of a particular type of grain moving from a given location. In his study, *"The Cost of Grade Segregations to Primary Elevators"*, Tom Askin of the CGC concluded that primary elevators on average handled 20.8 separate grades and types of grain. Reducing the number of grades by two would decrease the system costs by $0.13/tonne. With the industry considering implementing a just-in-time system, grading and grade segregation will become an important issue. The issue comes down to whether one should restrict some primary elevators on the grains and grades they have to maximize the use of larger train units or whether one should reduce the number of grades in the system overall. Grades and grade segregation is also relevant for producer track loading sites. Large bins of more than 4,000 bushels will necessitate some segregation of grains to avoid blending or else storage of "like" grain. Many existing producer track loading systems

have solved this problem by using only 4,000 bushel bins. The grain in each bin fills one hopper car thereby eliminating the problems of grain segregation. This practice also solves licensing problems as the loading site is not functioning as an elevator, blending and mixing grain, but, instead, is maintaining the integrity of the individual's grain.

III. Freight Rates

The WGTA freight rates are distance based. All points with the same distance to port are charged the same rate whether or not they are located on a branchline or a main line. These rates are calculated for single car shipments. Efficiencies could be realized from moving blocks of cars or unit trains. For this reason, the railways offer incentive rates for multiple car movements.

For 1994/95, the multiple car incentives offered by CN were:

18 cars	$1.50/tonne reduction in rate
20	1.75
50	2.50
100	3.50

In addition, CN also offered incremental volume rate reductions to encourage elevator consolidation. These incremental volume reductions were:

0-5 000 tonnes over the average for last 3 crop years	$0.75/tonne
5 001 to 10 000 tonnes	1.50
more than 10 000 tonnes	4.00

It has been estimated that unit trains would save more than the rates quoted earlier. In the IBI Group report, *"The Movement of Cleaned Prairie Grains through a Proposed West Coast Transfer Terminal"* of November, 1990, it was estimated that in 1986 dollars $3.50 to $5.00/tonne could be saved by using unit trains between Weyburn and the west coast.

The trend to large car spots and loading of 20 cars in a 24 hour period will be necessary for the system to remain competitive as well as to implement just-in-time delivery. Under the 24 hour train run, a train would depart the terminal in the early evening, spotting empties at elevators and sidings along the train run. The idea is to have all the cars spotted by 8:00 A.M. the next morning. While the crew rests, elevator managers, and producers would load their cars. At approximately 4:00 P.M. the crew would return picking up the loaded cars and any remaining empties, arriving at the terminal after midnight. The railways estimate that the savings can be as much as $100/car.

Producers operating existing track loading systems now suggest that a ten car spot is the minimum. Those with only 4 or 5 car spots are uncertain as to their future given the trend to larger car spots and the fact that incentive rates are not offered until one loads 18 cars. Although building additional sidings may be an option, it is a costly option. Given the uncertain future in a commercial environment, it is unclear at this time as to how long incentive rates will be offered by the railways.

IV. Grain Handling Systems in United States

Appendix I provides a summary of the grain handling systems in the major grain-exporting countries (Argentina, Australia, Brazil, Canada, France and the United States). Because of the similarities between the Canadian and American systems, this section shall focus on the U.S. grain handling system and some of its costs.

Higher yields in most parts of the U.S. compared to Canada permit a more dense system of interior terminals and other support systems. There are 8,000 elevators operating in the United States. A common estimate is that there is 30 to 35% excess country elevator space. This over capacity has resulted in selling prices of elevators being 25 to 30% of replacement costs.

Producer track loading is extremely unusual in the U.S. Most "producer"

loadings are handled by farmer cooperatives. These track loading systems use mainly pneumatic systems to move the grain and a tractor with a wide wheel base to position the cars. A review of the elevators in North Dakota indicated that 11% of the 354 elevators had storage capacities of less than 100,000 bushels, 32% had 100,000 to 250,000 bushels, 19% had 250,001 to 350,000 bushels, 18% had 350,001 to 500,000 bushels, 13% were 500,001 to one million bushels and the balance were over one million bushels. Car sidings for the elevators with less than 100,000 bushels, in general, were less than ten cars. For the 100,000 to 250,000 bushel operations, the car spots were equally split between under ten and ten to twenty-six. For elevators with over 250,000 bushels but less than a million plus, the car spots tended mainly to be twenty to twenty-six. The large operations with storage capacity of up to 5.5 million bushels had car sidings between 52 and 100 cars in length. The trend in the American primary elevator system is to larger complexes with the capability of loading at least 26 cars in a 24 hour period. Upright elevators tend to predominate the northern states although many facilities also have flat warehouses.

Like its elevator system, the American rail network has also been undergoing considerable rationalization. Short line operations have doubled from 13,975 miles in 1983 to 26,751 miles in 1992 while other lines have decreased from 153,833 miles to 111,785 miles over the same period. Export grain is moved by rail, barge or truck. The estimated split of grain shipments by these modes is 46% rail, 44% barge and 10% truck.

The storage capacity at export position in the U.S. totals about 12.5 million tonnes. The ratio of primary elevator storage capacity to port capacity is 13:1. This is because the U.S. terminal elevators are seen as handling facilities rather than as storage/processing facilities.

The United States does not have minimal receival standards for grain. Producers can deliver any quality of grain, with the appropriate discounts applied. Blending of grain is used to create a uniform product for sale. The U.S. system also has less grades of grain. The cost of segregation and quality standards is an issue for

the Canadian grain industry as debate focusses on the cost of so many grades versus the ability to realize a premium from the market.

Table 1.1 illustrates the costs and tariffs of moving grain in the Canadian system versus similar figures for moving grain from Minot, North Dakota to Portland, Oregon and to the Texas Gulf. The Canadian rate is a single car movement. The U.S. rates are single cars and a 52 car negotiated rate. U.S. freight costs are higher than Canadian rates for single cars but, comparable for the 52 car rate compared to the single car Canadian rate. The U.S. system has lower handling rates for the primary and terminal elevators. Lack of access to barges contributes to the higher rail rates for North Dakota. Areas with water access would have lower rates. **In order for Canada to remain competitive in the international marketplace, it will be necessary to achieve lower handling rates for primary and terminal elevators.**

Industry sources suggest that Canada will have to develop a logistics approach featuring just-in-time delivery to better use its infrastructure. System issues which are currently under discussion include branchline abandonment and the closure of facilities on these lines; construction of larger, high-throughput elevators to serve wider regions; increased use of multiple car spots to qualify for reduced rates; expansion of "customer" service to incorporate trucking from grain to the elevator; increased use of condo storage to provide the producer flexibility to "deliver" his grain; and, finally, increased cleaning on the prairies to export standards. These issues could have a significant impact on rail car allocation and utilization, the physical movement of grain into the system and may result in more pre-grading of grain on-farm prior to delivery into the grain handling system.

Table 1.1 Comparison of the Canadian and U.S. Transportation and Handling Systems

	Canadian System To Vancouver		US System Minot to Portland		US System Minot to Texas	
	C$/tonne	US$/tonne[5]	Single rate	52 Car rate	Single rate	52 Car rate
Farm to Elevator*	3.23	2.58	2.75	2.75	2.75	2.75
Primary Handling	16.14[1]	12.91	4.45	6.06	4.45	6.06
Rail Freight	34.30[2]	27.44	46.54	37.90	46.54	37.77
Marketing	3.33[3]	2.66	4.04	3.00	4.04	3.00
Terminal Handling	7.51[4]	6.01	3.67	2.57	3.67	2.39
Total	64.51	51.60	61.45	52.28	61.45	51.97

Source: IBI Group, "Grain System Efficiency", July, 1994

*this represents the operating costs of a farm truck; the other numbers represent tariffs

1. Includes cleaning.
2. Rate shown includes $2.18/tonne for ownership of government cars. Rate is for single car movement.
3. CWB costs including storage in primary elevator.
4. Storage and fobbing costs: cleaning included in primary handling.
5. C$ converted to US$ at $0.80.

Chapter 2

Technology In Grain Handling and Storage

I. Alternative Storage Systems

The layout and design of a storage facility should aim towards a reliable and efficient unit, easy to operate and integrated with other facility activities. When considering a storage facility, one should consider:

1. the required storage time;
2. the range and characteristics of the products to be stored, the method, rate and frequency of filling and discharge;
3. the volume of the bins;
4. soil carrying capacity and ground water level;
5. required foundations;
6. ability to adapt the structure to changing demands, expansion and technical improvements;
7. degree of mechanization, automation and operating costs;
8. reliability of the installation and maintenance requirements;
9. durability of the structure and degree of protection against the environment;

and 10. government regulations.

The following is a summary of the various types of storage systems used in the world today. The wooden elevators of the Prairie region are not included in this summary because they are outdated, requiring extensive maintenance.

1.1 Metal Bins

A. Corrugated Bins

Corrugated steel storage tanks have been used for on-farm as well as at terminals. In 1993, Moultrie Grain Association in Cadwell, Illinois erected two 265,000 bushel Butler steel tanks to increase their storage capacity.

Round corrugated bins are also a familiar site on the prairies. These bins are available in over 200 sizes with single bin capacities of up to 650,000 bushels. Hopper style tanks are available in capacities up to 45,000 bushels. These bins are made of corrugated sheets which are reinforced by metal girders placed on the outside to transfer the wall pressures to the concrete foundations. If insulation is required, a second layer of steel can be easily bolted to the vertical girders (see Figure 1.1). For larger bins with diameters of up to 90 feet, the manufacturer has the exterior wall made of corrugated sheets with the corrugations run horizontally while an extra internal wall of corrugated sheets is place vertically. This provides excellent wall rigidity and improves product flow. Metal silo facilities have been used extensively in Europe.

Traditional corrugated bins are an economical means of storage, costing approximately $0.70 per bushel to build (excluding aeration system and concrete floor). These bins with an aeration system and concrete floor cost approximately $1.00 per bushel. Used units cost $0.30 to $0.35 per bushel to purchase. Problems associated with corrugated bins are the corrugation itself. Industry has attempted to address this problem by changing the corrugation from every 2 1/2 inches to every 4 inches. However, the wavy pattern of the steel tends to trap grains preventing a complete clean-out of the storage bin. This necessitates manual cleaning. Bin sweeps used to move product out of the flat bins leave a residual of about one inch of the bottom of the bin. This also leads to manual clean-out.

B. Polygonal Bins

Polygonal bins of prefabricated flat wall panels assembled on site (see Figure

1.2) are common in Europe and have just recently been used in Canada. The panels consist of horizontally bent sheets linked together with vertical beams and reinforced at the edges (see Figure 1.3). The hollow vertical beams can be filled with concrete to increase the carrying capacity. This assembly system makes it possible to group several bins as one unit. Later additions are possible by adding more panels to the existing structure.

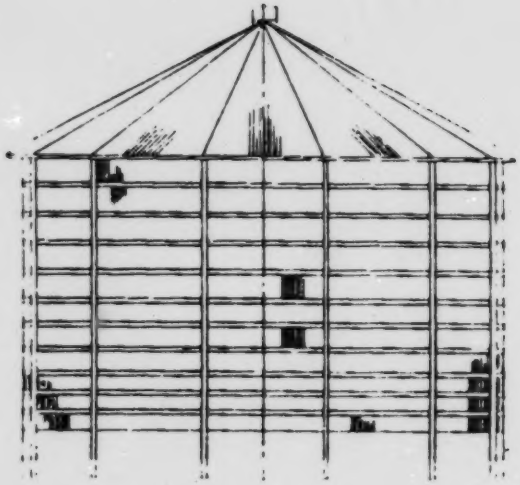
C. Site-welded Bins

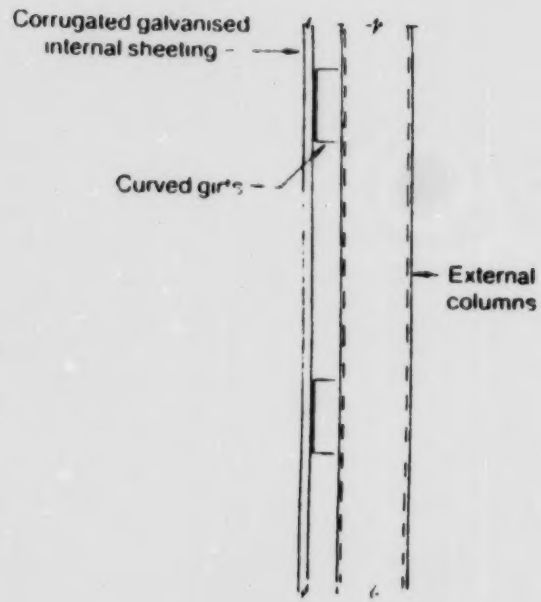
These steel bins use centred flat metal sheets that are welded into rings on the site and make it possible to assemble separate bins. The assembly of a welded bin is sometimes executed by means of a central mast which makes it possible to lift the different rings in the right order working from the top down (see Figure 1.4). One could also purchase prefabricated steel rings and bold them together.

In the United States, square bolted bins are becoming a popular storage option. These bins can have capacities of up to 135 tonnes. This later option provides increased flexibility as it permits extension of the size of the structure with easy bolt-on expansions, and allows one to use a variety of required capacities in one bin cluster. A sketch of a 4,000 bushel capacity bin is attached (see Appendix II--Manufacturers' Information). This bin would be ten feet square with a height of almost fifty feet. There is no distributor for these bins in Canada. Abel Manufacturing Inc. from Appleton, Wisconsin advised that their bins are relatively limited in size. Cost estimates received from Abel indicate that they are a costly option at about twice to three times the cost of a hopper constructed at the plant and moved to the site. However, they may be an option if track space is limited and flexibility for future relocation are desired.

D. Spiral Bins

The "Lipp System" (patented) consists of a spiral-winding construction in galvanized or stainless steel (see Figure 1.5). The silo body is manufactured at site using a profiling machine with rollers which bends into shape and fastens continuously in spiral a strip constituting the silo body.





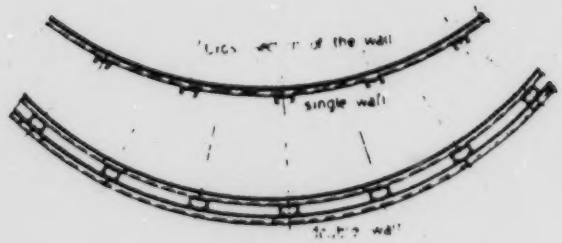


Figure 1.1 Corrugated Metal Bins--Single and Double Walled

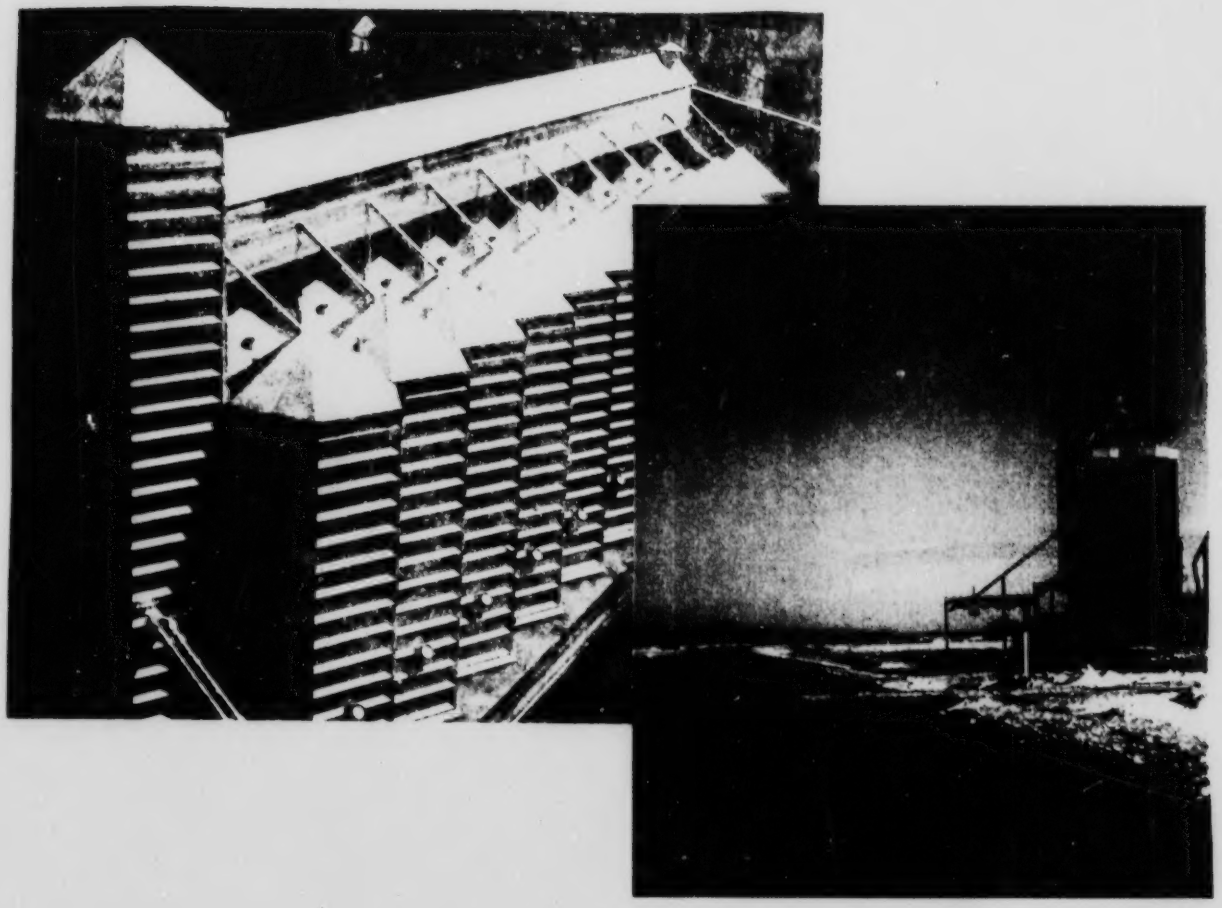
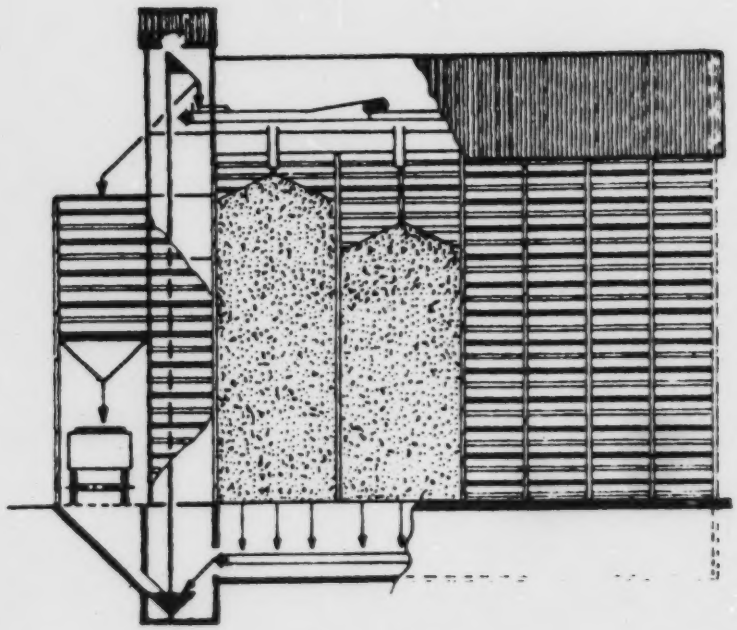
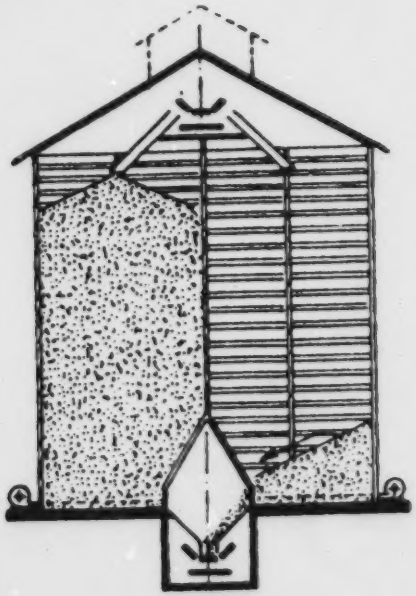


Figure 1.2: Hexagonal Metal Bins





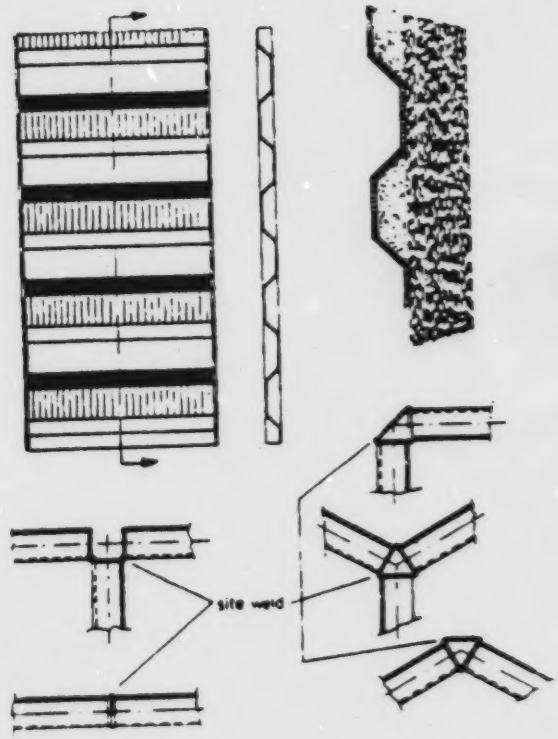
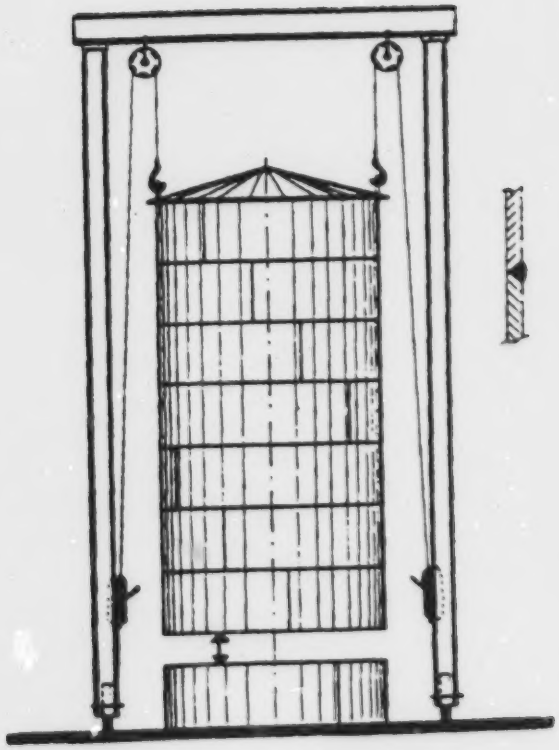
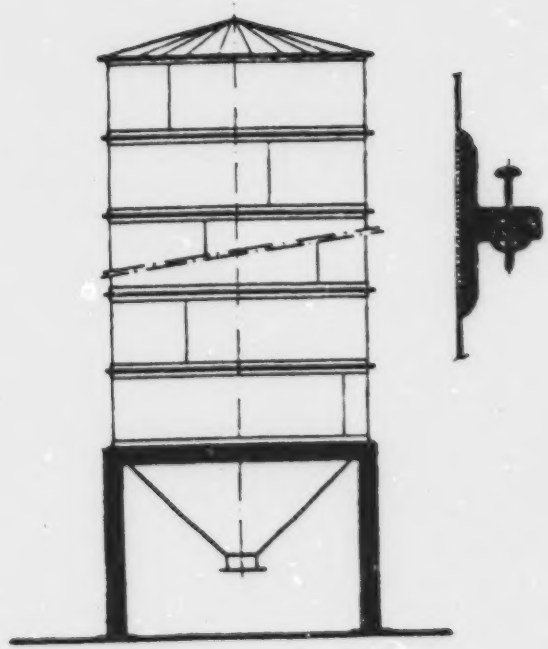


Figure 1.3 Polygonal Bins of Prefabricated Wall Panels



B Site Welded Bin



A Bolted Steel Bin

Figure 1.4 Steel Bins

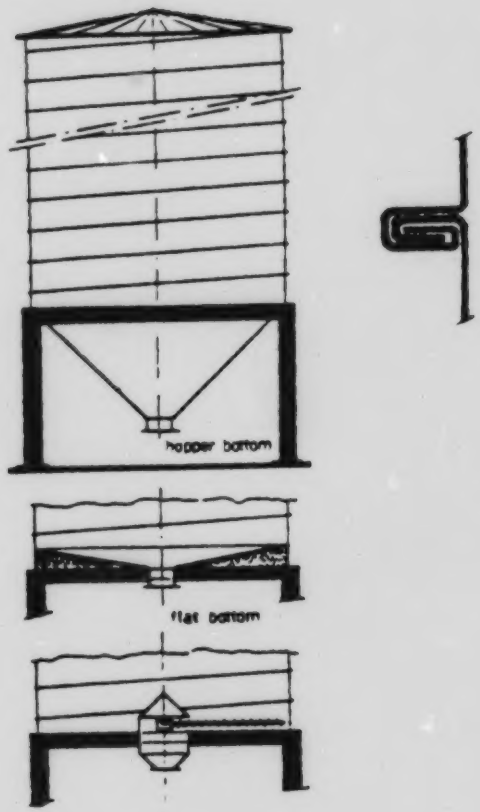


Figure 1 5 Lipp System of Spiral Winding Construction

E. Steel Hoppers Constructed at Plant

These bins go up to 4,200 bushels in size and include a rest platform. There are a number of manufactures in western Canada (Lode King, and Uniflow from Humbolt are two examples) who build these units and haul them to the site. The site must have a level concrete pad. The transport vehicle has a hydraulic system which tips the bin up and rests it on the pad. The process takes approximately 45 minutes.

These bins are popular because the structure has a smooth surface and can be purchased with an epoxy coat inside to facilitate complete clean-out. These bins are well suited to handling specialty crops. Cost is approximately $2.25 per bushel.

1.2 Concrete Bins

In the last two years, several farmer-owned cooperatives in the United States have expanded their storage and grain handling capacity with the addition of concrete storage facilities. Harvest States Cooperatives in Fergus Falls, Minnisota built four 80,000 bushel slipform concrete silos of 130 feet by 32 feet plus five interstice bins of various sizes to store wheat with different test weights, protein levels and moisture levels. Hogenson Construction Company of West Fargo (701-281-1742) did the construction in 1992. The Fergus Falls terminal has sufficient track space to handle up to 52 hopper cars of wheat. It is interesting to note that this facility is served by the Otter Tail Valley Railroad, a short-line with connections to Burlington Northern. The ability to move unit trains from Harvest States Cooperatives has meant that the Cooperative has had no problems in obtaining railcars.

In Osborne, Kansas, the Midway Coop Association decided to build additional storage and handling capacity at three of its eleven locations in 1994. They selected varying sizes of flat-bottom jumpform concrete tanks. The sizes ranged from 173,000 bushels to 269,000 bushels. Don Johnson & Son Inc. of

Minneapolis, Kansas (800-332-0385) served as the millwright on the project. Total construction took 16 weeks. Recently, Saskatchewan Wheat Pool constructed a concrete elevator at Rosser. Pouring of the concrete structure took only ten working days with around the clock pouring of concrete.

In construction, steel rod reinforcements and various additives are used to improve the characteristics of concrete as a building material and to extend its field of application. The slip form of concrete pouring is used for larger structures. This technique uses sliding casings to pour different layers without a stopping to ensure a consistent wall thickness (see Figure 1.6). The sliding unit consist of wooden boards on horizontal supporting beams on the inside and the outside of the structure. The supporting beams and structure can be adjusted to correspond to the wall thickness required. The hydraulic jack is used to gradually move the structure up as the reinforcing rods are put into place and the concrete is poured. Below these mould are metal scaffolding to allow the crew to finish the concrete surface on the inside and outside of the silo. Gravel concentrations, small cracks in surface an smoothness are easily repaired from this scaffolding. Construction is a long tedious process requiring around the clock work. It is essential that the contractor be experienced in this field as mistakes can lead to costly repairs later.

Concrete silos are costly to build and equally costly to maintain, especially if there are high levels of air pollution. Cost estimates range from $3.0 to $3.5 million. Some companies have opted to build hexagonal structures rather than the familiar round silos. These structures are even more costly to build because of the shape of the forms used in the slip. Most structures in Europe use a protective, resistant coating to minimize damage due to climate or pollution. Precast concrete elevators can be constructed for about 65% of the cost of a poured concrete unit. Upon completion of the base, a precast elevator can be constructed in about four weeks. The use of precast boxes and panels allows for either large or small additions by simply bolting to the existing units. The total elevator can also be disassembled and moved. Alberta Wheat Pool has used this concept to build a shop of fabricated precast concrete at Airdrie, Alberta.

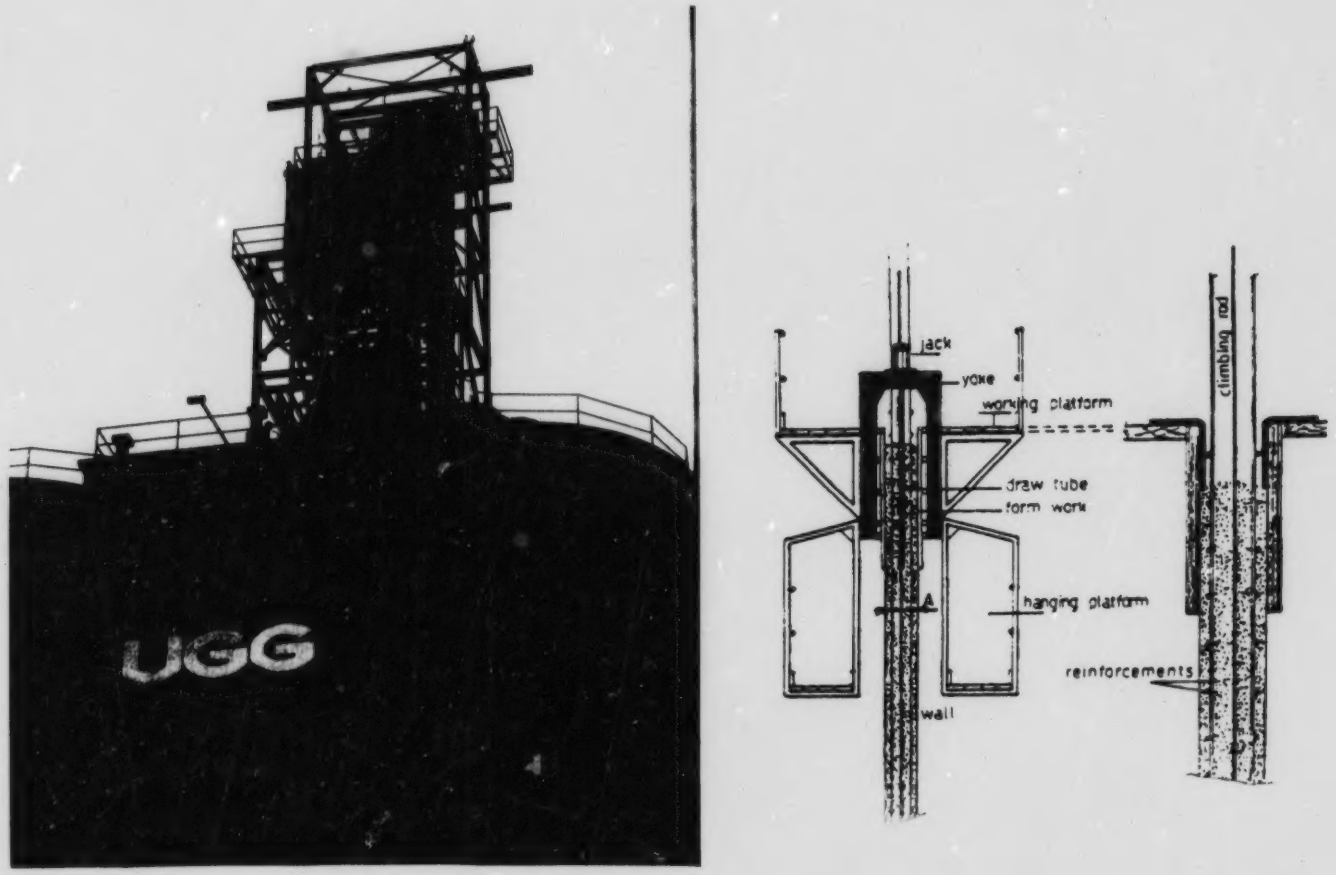


Figure 1.6: Sliding Shutter for Pouring a Concrete Silo

1.3 Horizontal Warehouses

Wick Buildings of the United States has multi-bay buildings with 60 foot centres and two 40 foot wings. These buildings can be designed to hold up to 1.5 million bushels of corn.

In general, grains are often stored in horizontal warehouses or flat storage buildings when:

1. they have to be stored over long periods of time,
2. the soil cannot support a vertical bin,
3. local building codes prevent high structures,

and 4. the storage will be used for other products during slow periods.

Horizontal warehouses have many disadvantages. In particular,

1. outflow capacity is low because gravity can only partially be used,
2. movement in and out is labour intensive,
3. more ground surface is needed to store the same quantity of product,
4. a larger roof area heightens the risk of water leaks and the need for more maintenance,
5. automation is difficult,

and 6. due to storage boxes being connected with each other at the top, contamination can occur.

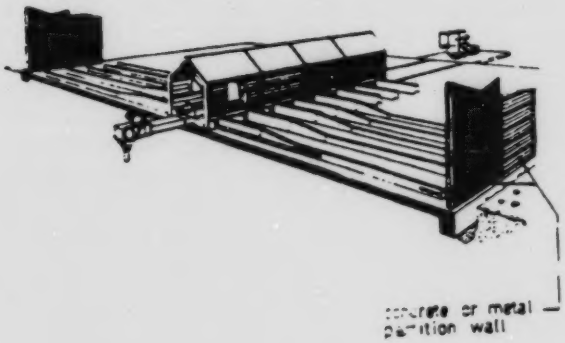
Horizontal level-floored silos are often used to store recently harvested grains as the height of the grain mass is limited and the ventilation system is more effective in removing heat and gases.

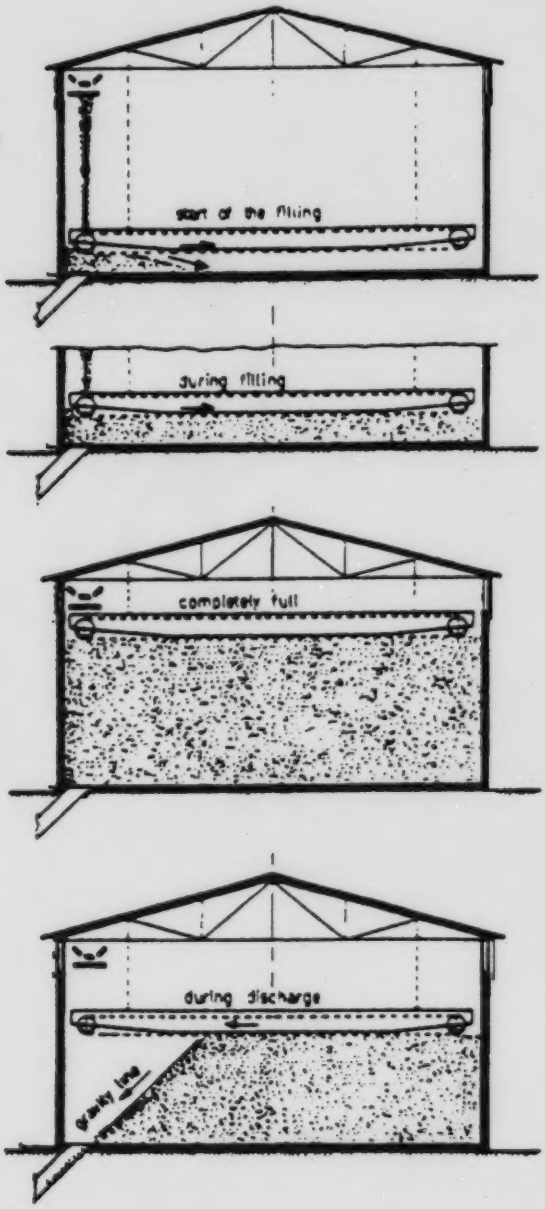
The fan in a horizontal silo can be used to not only cool and dry the grain but to activate the outflow of grain. As shown in Figure 1.7, air can be forced through the special ducts installed at ground level in each storage box to help the

B Using Conveyors

Flat Bottom Warehouse

A Using Ventilation





Warehouse With Several Sections

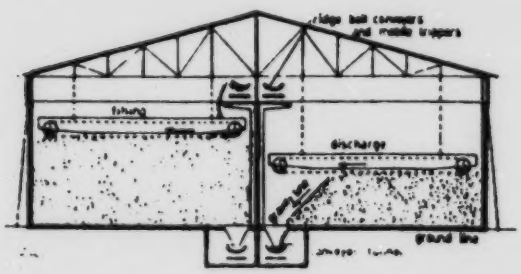


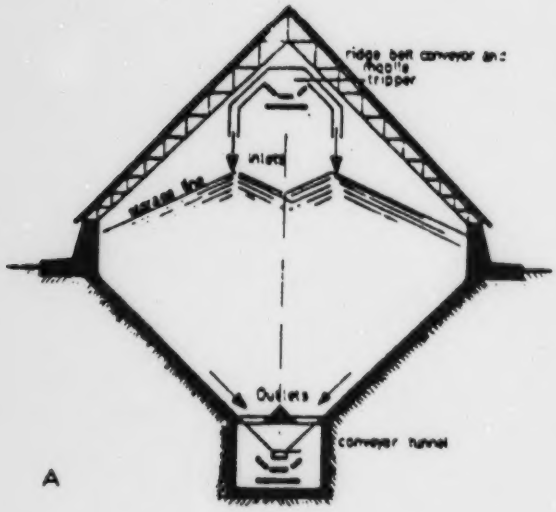
Figure 1.7 Loading and Unloading a Horizontal Warehouse

discharge of grain. The orientation of the duct outlets and air speed generated by the fan permit the gain to move to the box outlet gates. The partitions in the shed allow different grains to be stored. Under the floor of each section are ventilation ducts which pass in a longitudinal direction. These ducts are fully automated and are directed by the humidity and temperature control system that is located inside the grain. Fresh air is supplied through the floor ducts evenly through the grain. Heating of grain is therefore less of a problem.

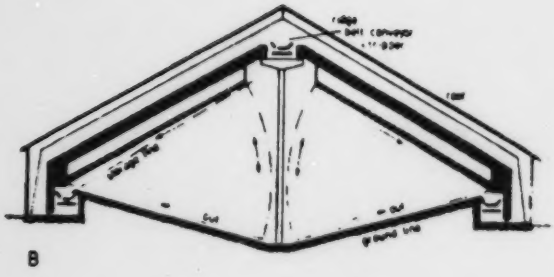
Each section in the warehouse can be filled by a belt conveyor and a mobile tripper. A mobile stirring installation is also available which levels the surface of the product by means of a chain conveyor which can be raised or lowered. This is also shown in Figure 1.7. For discharge of the box, gravity is first used. Later, the planing chain conveyor is used to push the product towards the outlet.

Christianson Bros. has developed the "push-pac" conveyor which is a portable, compact, self-contained, pressure only pneumatic system. The promotional material (see Appendix II) suggests the "push-pac" can be used to fill flat storage buildings. Model 60 has a conveying capacity of 1,900 bushels per hour. Larger units are available but, cost would be a factor.

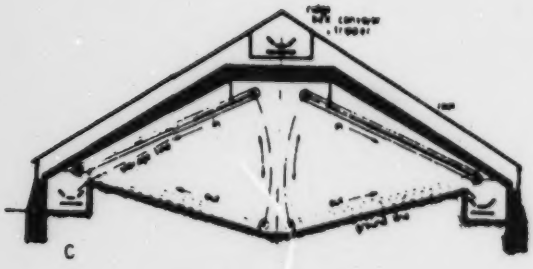
Storage facilities need not have a flat bottom. Those with a V shaped trough can either have a conveyor tunnel at the bottom of the V or else move the grain to the sides of the building for discharge (see Figure 1.8). Residual grain in the box is still a problem necessitating manual clean-out. If a horizontal warehouse is considered, it is recommended that it be used to store only one type grain to maximize its efficiency.



A: V-shaped Trough



B: Facility With Portal Screw Conveyor



C: Facility With Portal Chain Conveyor

Figure 1.8: Floor and Unloading Configurations for Horizontal Warehouse

1.4 Self -Supporting Domes

A. The Strarch Dome

The Strarch design uses high tensile capacity steel cables over which a stressed skin roof is stretched (see Figure 1.9). These structures have a minimal amount of supporting steel and can have spans up to 400 feet. The skin roof is applied to the structure prior to the raising of the unit. It has been used successfully in Australia. No examples of this structure have been cited in North American literature.

B. Concrete Dome

Thin shell concrete domes (agridomes) have been used as large free-span structures for a number of years. This patented "Binishell"system was developed by Howe Int. Ltd. (Canada) and has been used throughout the world. Construction involves placing fluid concrete and steel reinforcement flat on the ground between two re-usable membranes (see Figure 1.10). The structure is raised by air pressure while the concrete is still plastic so it can assume the dome shape. This method allows an eight day construction cycle. Vibration equipment is placed in the centre of the dome before raising it. These vibrating trollies are pulled down from the centre support to the base. After deflation the two membranes are removed and a entrance is cut into the structure.

In the United States, this construction method has been altered to use a urethane foam to first be applied to the vinyl membrane. Reinforcing steel is placed under the foam layer and concrete is onto the foam/steel form to give a thin concrete shell (see Figure 1.11). The vinyl membrane may be remove or left before an outer polyurethane coating is applied. This technique has the advantages that it requires minimal concrete and reinforcing steel, and is well sealed. These structures can be up to 150 feet in diameter.

The handling systems of filling and discharge permit full automation and a high turnover ratio compared to vertical bins. The domes also allow a large truck access door, permitting the alternative of storing bagged specialty crops, if

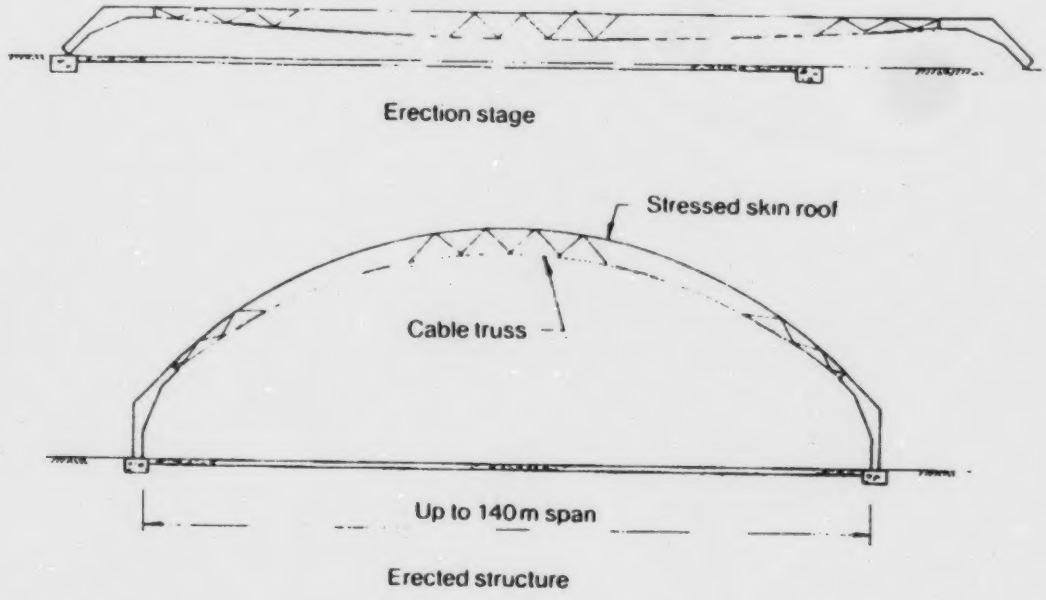
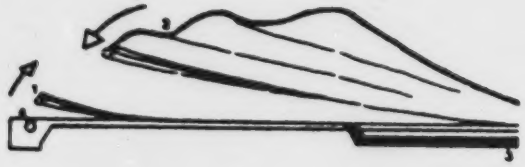
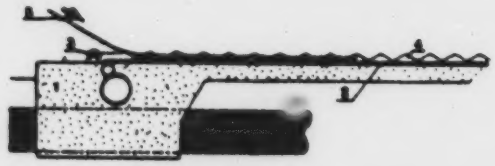


Figure 1.9: Strarch Dome



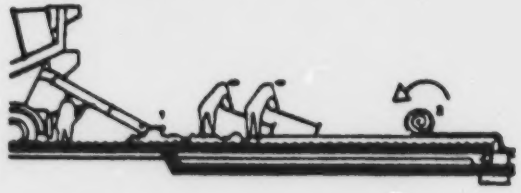
Laying of the Internal Pneumatic Form and Pumping Station

1 – removal of the tubular form
2 – laying of the internal pneumatic form in neoprene
3 – air inlet pipe



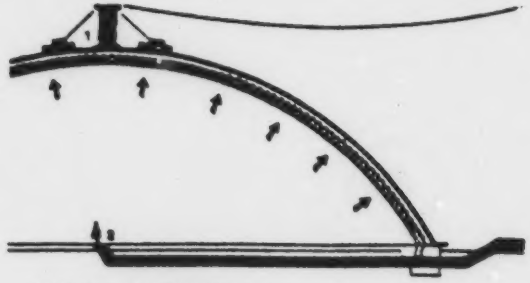
Fixing Reinforcement of the structure at ground floor

1 – foundation
2 – internal pneumatic form in nylon reinforced neoprene
3 – reinforcement peripheral anchoring ring
4 – spirals forming the extensible reinforcement
5 – reinforcing bar sets inside the spiral



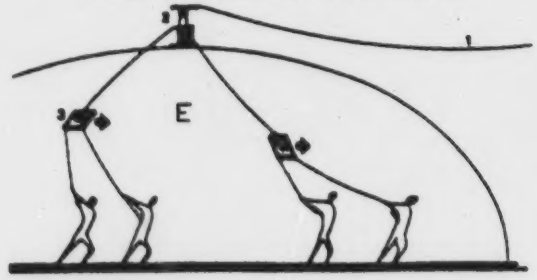
Placing at Ground Level the Concrete for the Structure

1 – placing concrete on reinforcement and distribution by normal methods or pumps
2 – external P V C. form laid on the concrete



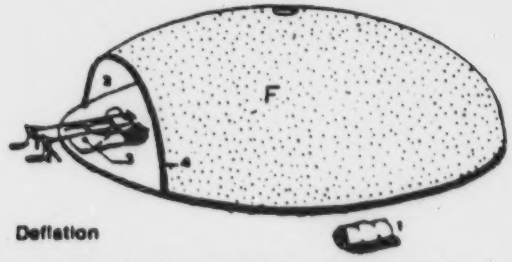
Uplifting of the Structure

1 – vibration equipment placed in the centre, before starting the uplifting
2 – air inflation underneath the internal pneumatic form and gradual uplifting of the whole system



Vibration

1 – input of the vibrators
2 – cylinder with electric cables
3 – vibrating trolleys which are rotated and pulled down from the central support to the base



Deflation

1 – external P V C. form, after recovery and refolding
2 – cutting the first opening
3 – removal of the internal pneumatic form
4 – forming reinforced edges to openings

Figure 1.10 Binishell System of Constructing a Concrete Dome

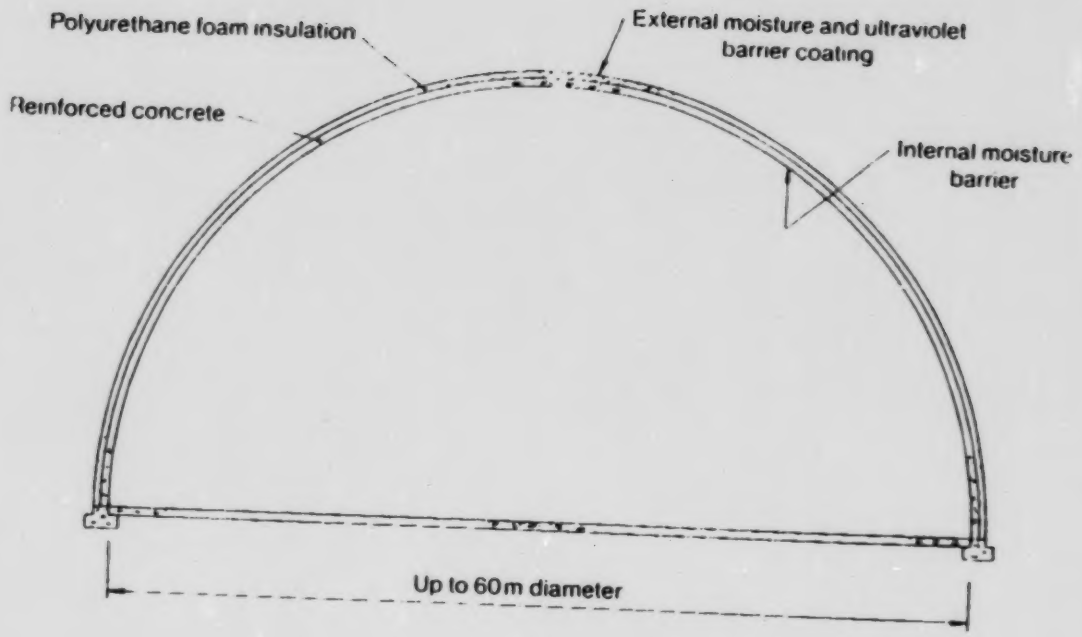


Figure 1.11: U.S. Concrete Dome

required.

Considerations of cost compared to concrete silos, length of time for construction, climate, low soil loading and design adaptability make the concrete dome an attractive option. For producer track loading systems, they are not practical both from a lack of flexibility to move the structure and cost compared to steel hoppers.

C. Spantech

The Spantech building is a self-supporting arch-type structure which involves the on-site rolling of deep high strength structural sections (see Figure 1.12). This enables the rolled sheet steel raw materials to be taken to the site in ex-mill rolls, folded into shape and erected immediately. The sections are locked together using a crimping device operated on the ground. Because it does not involve bolting of sections it is required less labour and reduces the chance of structural weakness of water seepage. This system can handle up to 150 foot diameters.

1.5 High Capacity Steel Silos

Klinkenberg BV. of the Netherlands has developed and patented a cylindrical storage bin with a favourable height to diameter ratio similar to the oil tanks in use. The structure has two walls. The space between the inner and outer walls can be filled with insulation if desired. The silo floor is a slightly reinforced concrete slab. These silos feature fully automatic filling and discharge of all types of bulk products. Product flows through a telescopic spout to a distributing auger which spreads it evenly over the silo (see Figure 1.13). This auger is also used when unloading the silo. The controlled layer-by-layer filling and discharge minimizes product segregation.

The telescopic spout may be a practical solution to handling specialty crops to minimize grain damage. No distributors of a telescopic spout have been identified in Canada.

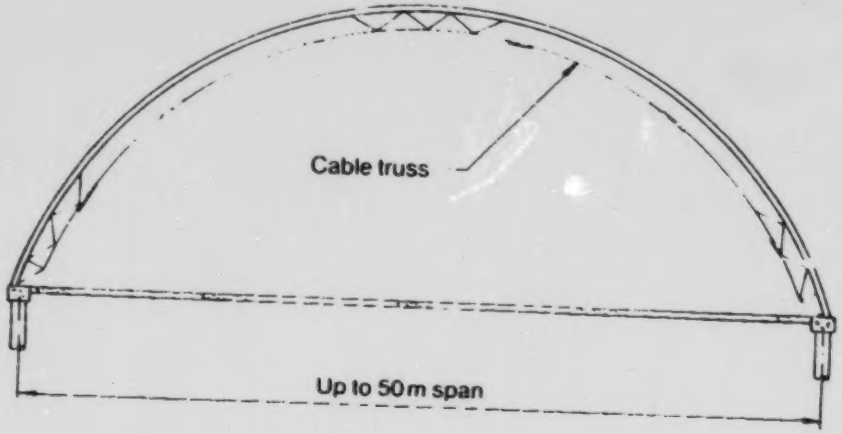
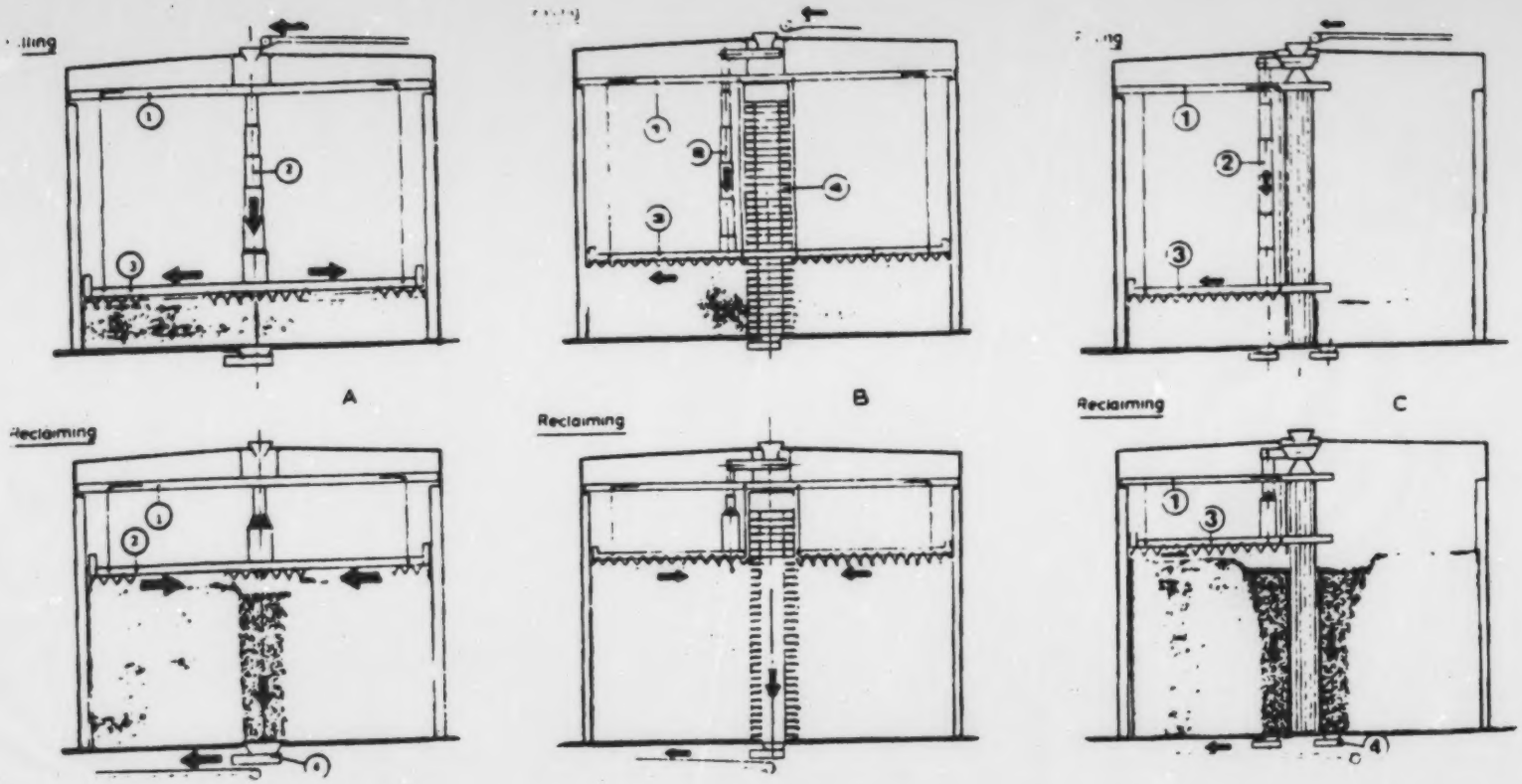


Figure 1.12 Spantech Structure

A Without a Centre Column

B With Slotted Centre Column

C With Centre Column



(1) rotating overhead bridge
(2) telescopic spout
(3) auger
(4) discharge

Figure 1.13: High Capacity Steel Silos

1.6 Temporary Structures

A. Aero Stores

High tensile fabrics are being used in some countries for storage. In Australia loose fabric structures call Aero Stores have been constructed. This design involves a centre pole and tent-type storage where the tent fabric is supported directly on the surface of the grain. The fabric is raised up the centre pole until the storage is completely filled. Similar type structures were used in the United States during the "Bin Buster Year" of 1994. West Central Cooperative in Ralston, Indiana used galvanised steel panels for supporting walls and a poly tarp to cover over a million bushels of corn at their facility.

Problems associated with this structure relate to moisture seepage when the product is moved out of the structure as the dome shape collapses. Because of the large exposed area, a 2% loss due to water seepage can translate into several thousands of bushels of grain. These structures should be only viewed as temporary and not a solution for a producer track loading site.

B. Butyl Silos

In Britain, the firm, British Crown, has used large-scale airtight storage facilities to store damp grain. The containers would also have potential use for temporary storage where grain would have fast turn around. The flexible bags are erected inside a cylinder of steel mesh to store grain. These bags may be polyvinyl chloride or polyethylene but are normally made of butyl. Smaller bags of 20 to 40 tonnes are equipped with lugs, which allow the neck of the bag to be pulled to the top of the cage, using ropes and pulleys, before filling. A tube inserted in the centre of the small bins through a sleeve in the butyl permits an auger to be inserted into the grain. The top of the small bins is closed by clamping the loose butyl sheeting in a double fold between three metal bars bolted together. The auger sleeve is treated in a similar fashion. Larger bags of several hundred metric tonnes are inflated by fans when constructing or filling.

These flexible structures collapse onto the grain as the silo is emptied. The top of the bin must be supported on a tripod to shed rain and avoid entanglement with the auger. Some undesirable features of these storage methods are:

1. the loose fabric can bill and may flap in windy conditions.
2. rain water may accumulate on the fabric of an empty or partially filled storage. This has potential implications to maintaining the integrity of the grain.
3. humidity can build up within the structure causing deterioration of the quality of the grain.

C. Plastic Bunker

The Australian Wheat Board has developed an earth-covered bunker for safe temporary grain storage. The grain is placed in a plastic envelope which rests on the ground which has been levelled. The sides are supported by permanently constructed low earthen walls. Small manageable sheets of heavy duty woven plastic (canvacon) are used which can be joined together using double-sided tape. The edges of both the top and bottom sheets are rolled together to form a good seal and then are buried in the earth. A thin layer of sand is spread over the plastic to protect the plastic from damage due to stones or hard lumps of soil. Then the sand is covered with about 3 feet of dirt. The dirt is slightly sloped to allow water drainage.

When unloading, the top layer of soil is removed by excavator and piled on the sides of the bunker. The sand it then removed and the cover sheets are pulled back to allow outloading. These bunkers can be re-used with minor maintenance. Temperature problems and other devices can be inserted into the grain to monitor it or fumigate. This is the lowest cost storage available. It is not practical for bulk handling facilities unless one anticipates keeping the product for a longer period of time.

1.7 Inflatable Warehouses

Large inflatable warehouses can provide temporary as well as long term storage of grain. There are two types of inflatable structures:

1. those formed by a higher atmospheric pressure between the cover and the floor plate. This type needs a permanent supply of air and an air lock so that people and goods can enter or leave the structure.

2. a double cover unit divided into several shells which are blown up separately between the two layers. In this case, the space under the cover is not pressurized.

In either case, the proper design of the structure is important so that the surface does not become deformed and distorted due to uneven weights of grain. Materials used for construction must be able to withstand the air pressure, be flexible to withstand rough transport and installation conditions, and be resistant to climate (rain, ultra-violet rays, snow, etc.). The most satisfactory material is vinyl-impregnated nylon. The vinyl can be treated with additives to prevent mould, assure flexibility and increase viscosity. Ultra-violet rays can be resisted by selecting a white or light colour. The seams of the structure can be joined by welding, gluing or sewing. Most manufacturers prefer to hot weld the seams. The fan's capacity must be sufficient to compensate for any air that escapes. General practice is to have two fans each with the required capacity to ensure the structure remains inflated even if one fan should stop. Although this system has higher cost and energy needs, it is truly flexible to changing market strategies on location.

1.8 Conclusion

Based on the various structures available, steel hoppers made at the plant and transported to the site or corrugated steel bins are the two most suitable structures for storing grain at a producer track loading site.

II. Internal Conveying Systems

Before selecting a conveying system, one must consider:

1. types of products to be handled,
2. if the system will be inside or outside and the possible climatic conditions (wind, moisture, etc.),
3. required speed relative to other equipment including peak capacity and duration of the peak,
4. number of loading sites, number of discharge sites, the length of conveyance and the height or lift required. One should use gravity wherever possible,
5. the design to minimize spillage, product build-up and dust generation,

and 6. number of hours and days use per week.

This information will determine the type, size and design of the conveyance required.

2.1 Belt Conveyor

The belt conveyer is an all-round, economical and reliable means of transporting product over long distances. It can be installed horizontally, slightly inclined or declined. The maximum angle a belt conveyor can be sloped depends on the product being handled but the general rule of thumb is to never exceed 15°. Belts can also be curved in a vertical plane. Figure 2.1 illustrates a basic belt conveyor

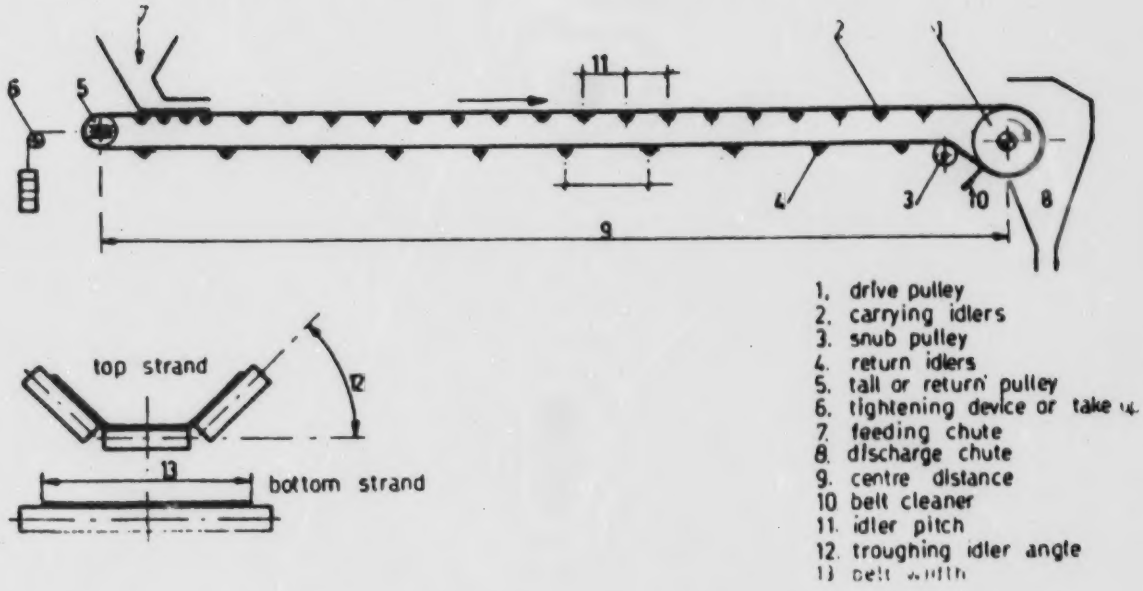


Figure 2 1: Basic Belt Conveyor

which consists of an endless belt wrapped around two pulleys. Between the pulleys on the end, the belt is supported by a series of roller sets and is tightened by a take-up devise. The roller sets or carrying idlers should be approximately the belt width apart to avoid sagging and increased friction. Additional idlers are required at all loading points. Belt conveyors have the ability of being used in two directions. The desired capacity determines the belt selection, belt width, belt speed and belt troughing. Trough angles can be 20°, 30°or 45°with 4, 5 and 6 inch diameter rolls. Belt speed should be selected to minimize product spillage. Deeper layers of grain and a lower belt speed will reduce the generation of dust.

The belt constitutes a large portion of the cost of the conveyer. The belt has two components--the carcass and the cover. The carcass consists of one or more piles of rubberized fabric. It can also contain steel belting which has both tensile strength and carrying capacity. The cover is made of rubber to protect the belt from use.

The pulleys should have a width 15% greater than the width of the belt. Welded steel pulleys are preferred because of their strength. Covering the pulley with rubberized fabric will improve traction. These rubberized coverings may be fish-boned (with the V- shape pointed in the revolving direction), chevron cut (cross hashed) or gripwrap (Herringbone design).

A belt conveyor will be most efficient if the product is loaded uniformly and the height dropped is minimized. The belt must have extra support under the loading zone. An impact saddle can absorb the impact of the product and prevent spillage. Spillage can also be prevented by using rubber skirtboards.

Belt cleaners should be located on the underside of the head pulley to remove dirt. Cleaners can be a strip on a counterweight, a revolving brush or a spring loaded cleaner. Cleaners can be made of metal, ceramic, rubber or plastic. Less wear on the belt occurs if one uses rubber blades or nylon fibre brushes.

Belt conveyors can be enclosed to avoid dust emission and to protect the conveyor from the elements. Belt conveyors can be covered with corrugated plastic sheets, a rubber cover to allow lengthwise movement of the loading chute or a small shed.

Special belt conveyor configurations are shown in Figure 2.2. Item A shows a two-way belt that can transport the grain in both directions at the same time. Item B shows a telescopic belt conveyor where the drive pulley and discharge chute may be moved over a certain length. Item C shows a shuttle belt conveyor which can be used to distribute grain into underlying bins. Item D shows alternative methods of filling a horizontal warehouse.

2.2 The Aerobelt

Most of the components of the Aerobelt or jet belt are similar to the conventional belt conveyor. This system which was patented by Sluis Machinenfabriek BV. The Netherlands consists of an enclosed tubular trough in which the belt and grain is supported by a film of air (see Figure 2.3). Air is blown into the trough section by one or more small fans and escapes through small holes in the trough. The number of fans required depends on the length and width of the conveyor. This system does not require idler rollers but only pulleys. The Aerobelt has the advantages of:

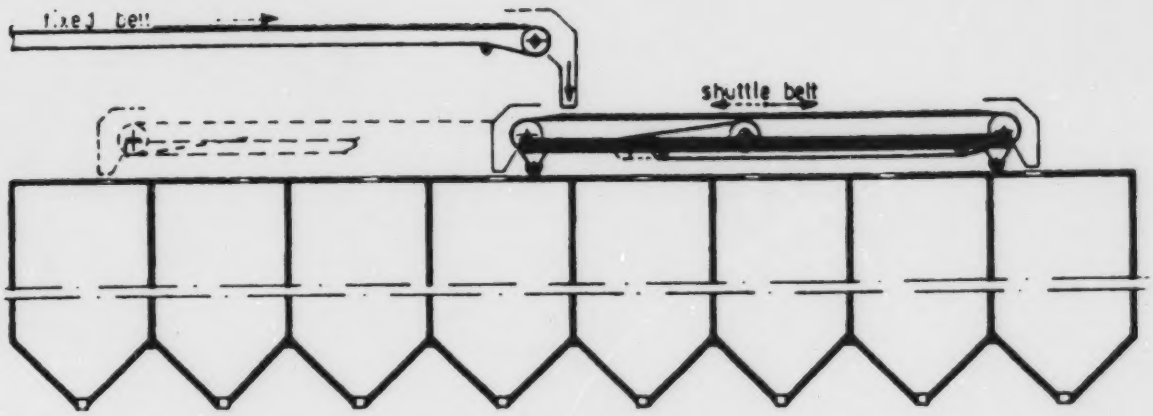
(a) less moving parts therefore less wear and maintenance,
(b) less power consumption with steeper slopes possible compared to a conventional conveyor,
(c) even transport of the belt keeps the product virtually motionless preventing mixing or segregation,
(d) minimal dust accumulation,
and (e) the system is self supporting.

These belts tend to be fairly costly and not a practical solution for a producer loading site.

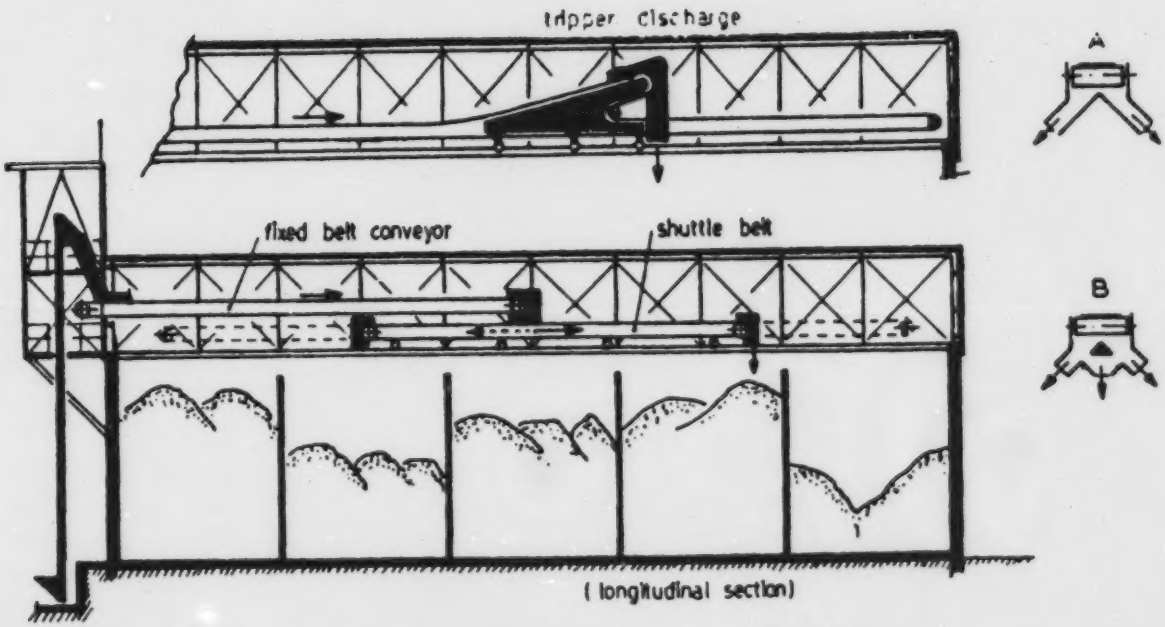
Figure 2.2 Conveyor Belt Configurations

A 2-way Belt

B Telescopic Belt



C Shuttle Belt



D Methods of Filling a Horizontal Warehouse

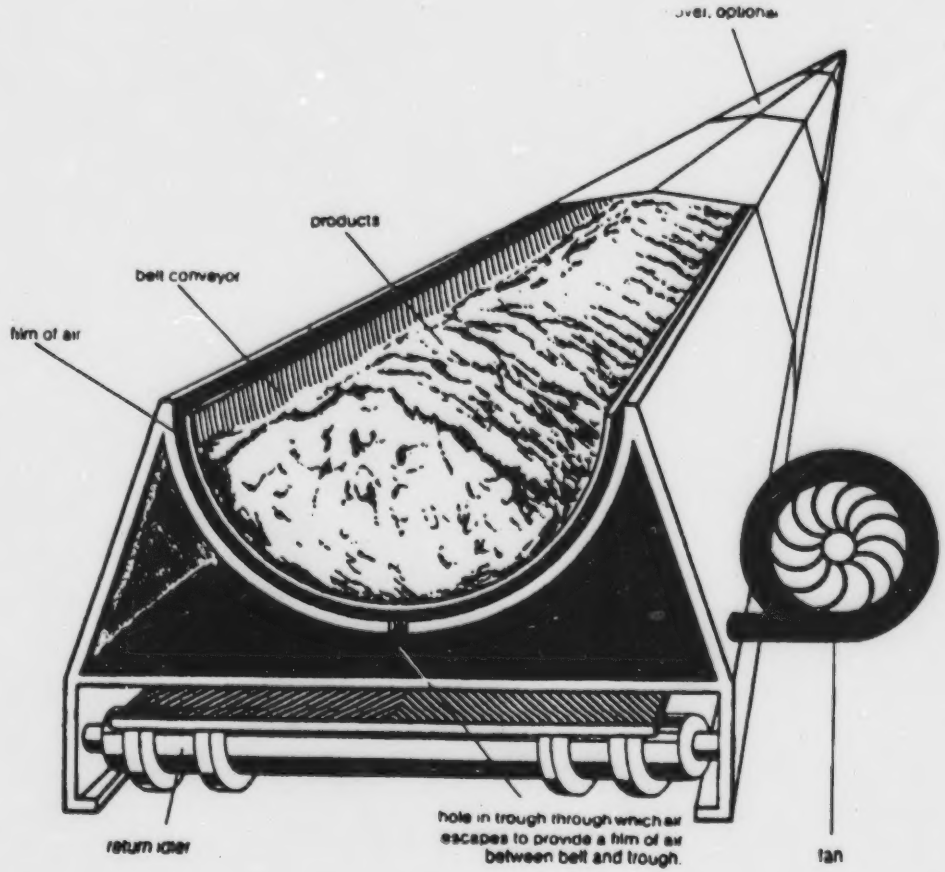

products
belt conveyor
film of air
return idler
hole in trough through which air escapes to provide a film of air between belt and trough.
fan

Figure 2.3. Aerobelt Conveyor

2.3 The Pipe Conveyor

The pipe conveyor has been patented by Japan Pipe Conveyor Company Ltd., Japan. This conveyor fully encloses the product in a rubber belt tube as it travels over a system of idlers. At the loading point the belt is V-shaped. After loading the belt forms a pipe shape by overlapping the sides as shown in Figure 2.4. The overlap is equal to half of the pipe's diameter. Just before the discharge point, the belt opens to allow for normal unloading. It reassumes the pipe shape for the return run, thereby preventing the dropping of any residue product.

This system has the following advantages:

(a) transport is pollution free with no product leakage,
(b) the "pipe" can be curved horizontally and curved up to 30 in the vertical plane,
(c) the system can be used for back haul,
and (d) the capacity is high compared to conventional belts with less space required.

Experience in the industry has indicated that the pipe conveyor can have problems with extreme temperatures found in our climate. In addition, large volumes of product movement would be required for this to be an economical option.

2.4 Tube Conveyors

The tube conveyor is suitable for intermittent use over short lengths and at relatively low capacities. As shown in Figure 2.5, the belt is supported within a steel pipe which provides support to the span in lieu of idlers. This design is considered to be an alternative to augers.

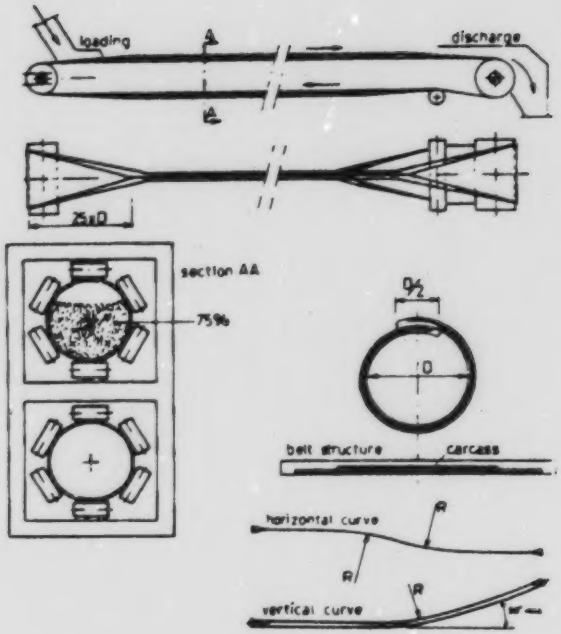


Figure 2 4 Pipe Conveyor

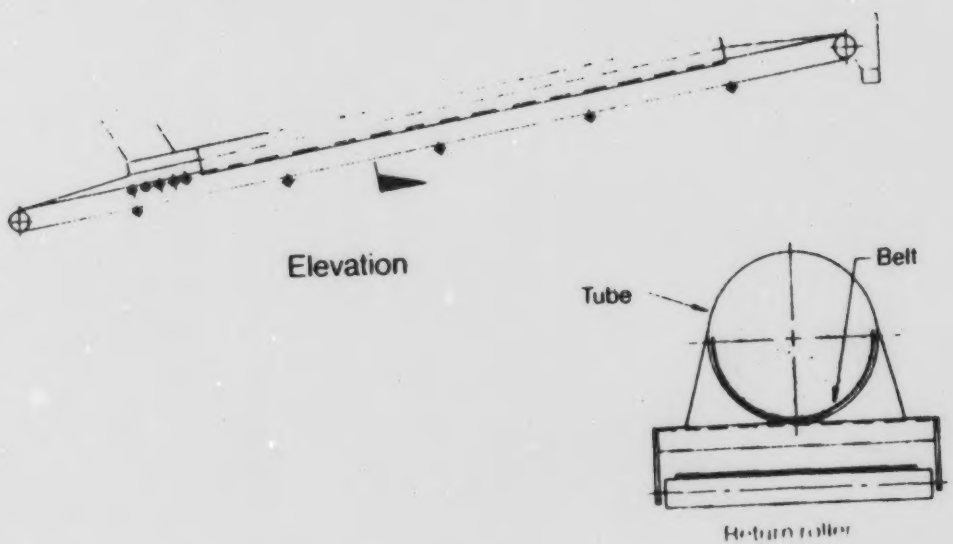


Figure 2.5. Tube Conveyor

2.5 Bucket Elevators

Bucket elevators are the predominant technology used in the vertical conveyance of bulk grains. The design has been relatively unchanged over the years. The bucket elevator has the following advantages:

(a) it has high mechanical efficiency,
(b) the required space is minimal and it can be freestanding with a service tower,
(c) operation is in a well enclosed housing unit which is quiet,
and (d) the units are reliable with minimal wear.

Disadvantages include product breakage due to the impact of the collection buckets, potential mixing of products, potential for overloading and dust emissions in an enclosed space which may cause explosions. The basic components of a bucket elevator are shown in Figure 2.6. It requires a drive pulley and a return pulley. Capacities go from 85 up to over 40,000 bushels per hour.

The capacity of a bucket elevator depends on the conveying speed, content of the buckets, bucket design and spacing, and the way the buckets are loaded and unloaded. Bucket elevators with a belt carrier can be used at fairly high speeds. This belt must have a minimal amount of stretch to prevent slippage and extend the belt's life. Usually belts are made of rubber or PVC. Chain elevators are used at lower speeds.

Product can be fed in two ways: the backfeed system where the buckets move in the same direction as the product flow and are filled by digging, and the frontfeed system were the buckets move in the opposite direction to the incoming product flow. The best results are obtained in the frontfeed system as it reduces the force on the belt, the buckets are less strained and grain does not accumulate between the bottom of the elevator and the buckets. The bottom of the elevator should have access for cleaning.

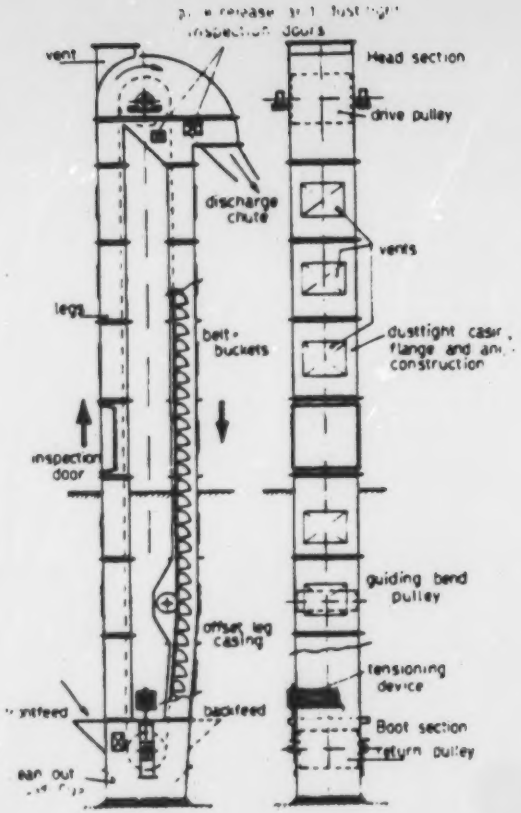


Figure 2.6. Bucket Elevator

When unloading, bucket elevators usually get rid of the product through centrifugal discharge and through gravity. To prevent product from falling back down the leg, an adjustable cut-off plate should be set as close to the lip as possible without the danger of the buckets striking it. A service door should be also at the top of the elevator. Explosion vents in the top are also recommended.

For improved efficiency and to reduce costs of bucket replacement, it is suggested that wider elevator belts with two or more rows of buckets be used. These buckets can be made of polyethylene, nylon, urethane, carbon steel or stainless steel. There are over 50 different sizes of buckets available on the market today.

When handling specialty crops, it is recommended that one operate the bucket at a lower speed. To do this, one must have a higher capacity than if operating at "normal" speed. Discussions with producers having loading sites suggests that to be able to load at 4,000 bushels/hour, the bucket elevator must have a capacity of 6,000 bushels/hour.

Bucket elevators are expensive, ranging in price between $50,000 to $60,000 for a 10,000 bushel/hour capacity. In addition, these elevators require a tower for servicing the equipment. The towers can cost upwards of $15,000. Bucket elevator systems have the disadvantage that the salvage value is limited, unlike an auger.

2.6 Corrugated or Pocket Belt Conveyor

These conveyors have pleated vertical sidewalls vulcanized to a convey belt (see Figure 2.7). The sidewall can be installed at any angle. The product is carried in the pocket and is prevented from falling backwards because of the cleats. These belts normally operate at speeds 30 to 50% of conventional conveyors. These systems are expensive because of the specialized belting. The cost of the material and the high energy consumption do not make this conveyor a practical

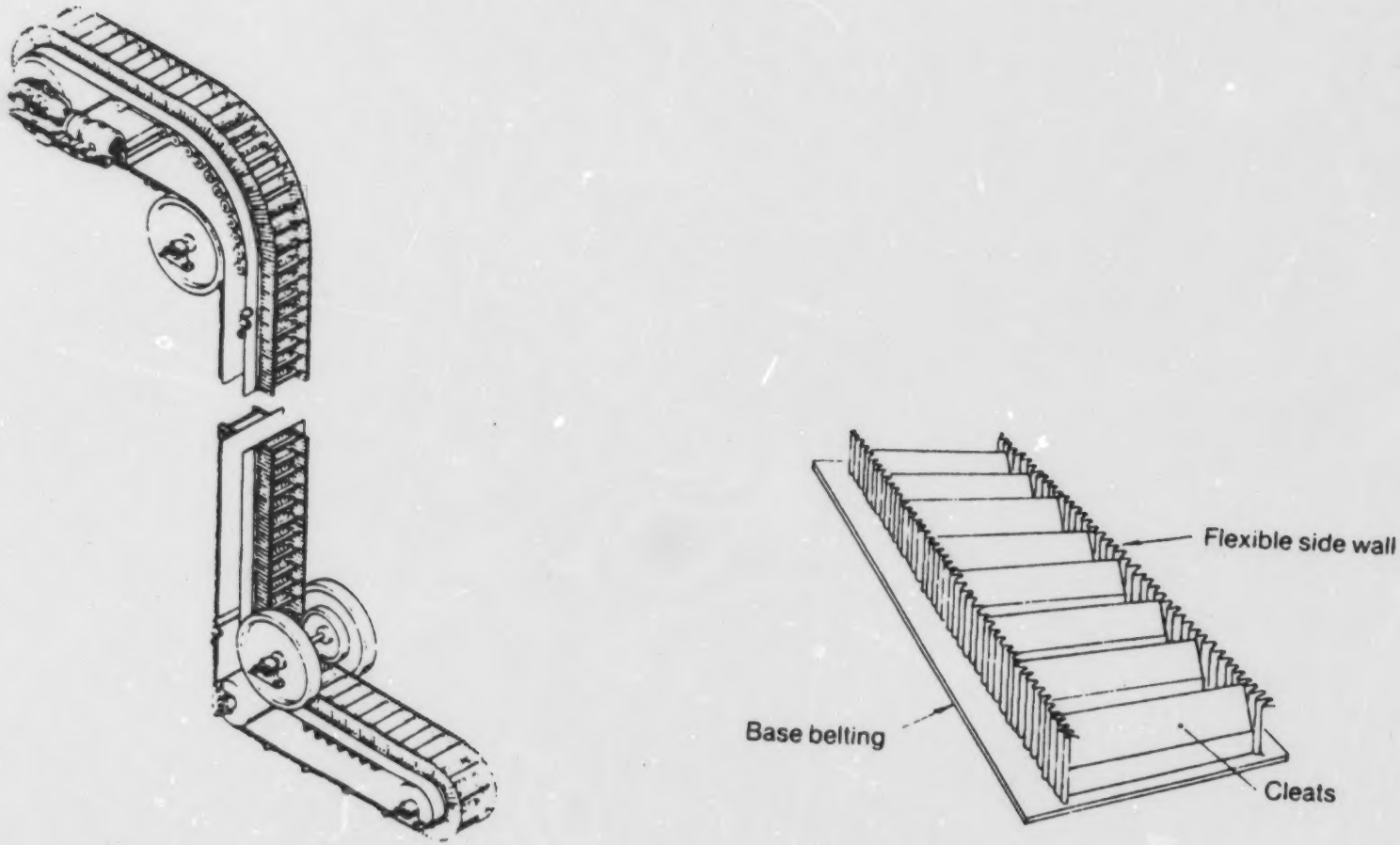


Figure 2 7. Sidewall Belt Conveyor

solution for a producer loading site.

2.7 Sandwich Belt Conveyors

Sandwich belt conveyors have a sidewall belt and a conventional belt combination (see Figure 2.8) which are compressed by air pressure or mechanically with articulated spring-loaded rollers thereby "sandwiching" the grain between them. These units are able to raise products vertically at higher speeds and capacities than conventional bucket elevators. This system has the advantages of minimizing dust and the ability to run in both directions. There use is more likely to be port terminals where the capacities could justify the purchase.

2.8 Chain Conveyors

Chain conveyors can have capacities of up to 69,000 bushels per hour. Sizes of the units range from 6 inches to 24 inches. Inclines of up to 60° are achievable. Chain conveyors are useful if multiple discharge points are required. These conveyors use less space than comparable belt conveyors. They also have the advantage that their construction is self-supporting.

The chain conveyor has a rectangular closed trough in which an endless chain is pulled (see Figure 2.9). One part of the chain serves as a means of conveyance while the return part of the chain is free. The chain is driven by a drive sprocket located at one end and travels back through a return wheel fitted with a tensioning device. The chain has flights which move the product along. The design of the flights and the material they are made of depends on the manufacturer. From the loading point to the discharge outlet, the product is dragged along as a compact mass on the bottom of the trough. The return of the chain is at the top. This is given the name "en masse" or "drag" conveyor. The bottom of the conveyor may be flat or round.

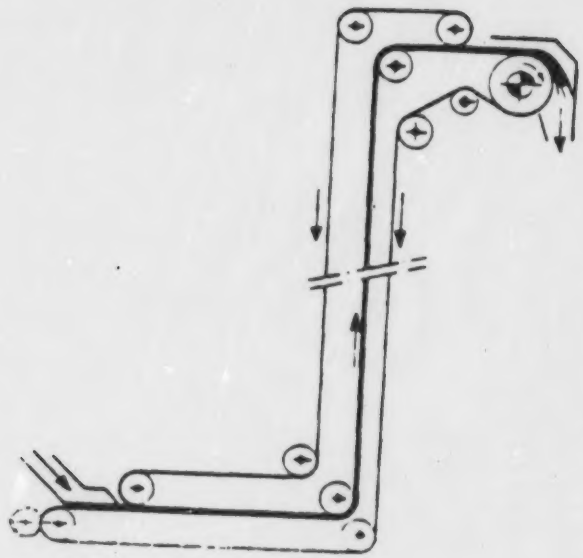


Figure 2 8: Sandwich Belt

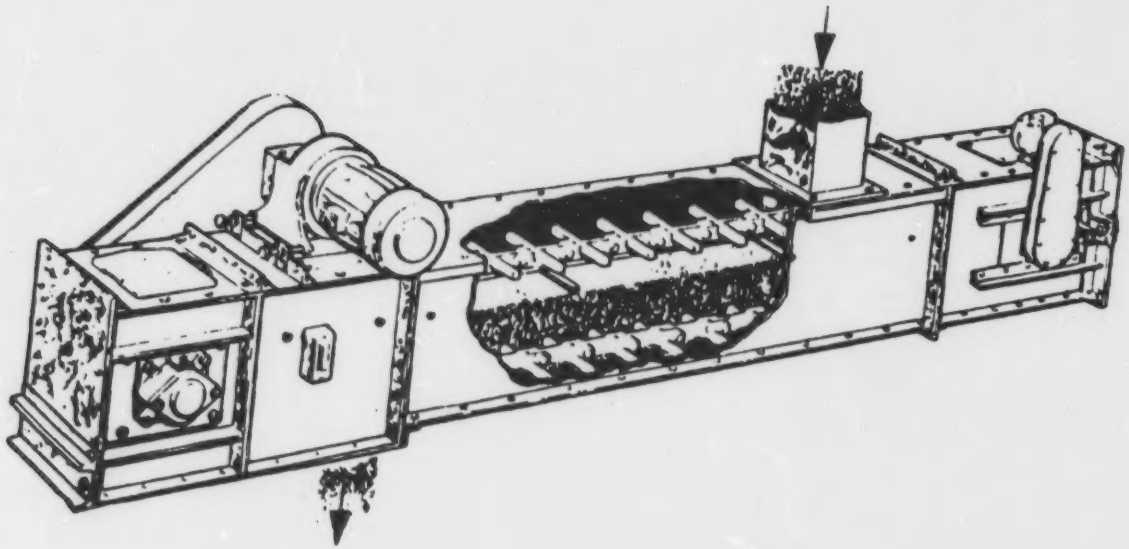


Figure 2.9 Chain Conveyor

2.9 Screw Conveyor

The screw conveyor or auger has been the oldest known type of conveyor. It can be used in horizontal, inclined or vertical applications. The screw conveyor consists of a tubular or U-shaped trough in which a shaft revolves. The shaft is supported over fixed distances by means of intermediate bearings. The capacity of the screw conveyor depends on the screw blade, size and shape of the cargo. In general, free flowing products can only achieve a 45% fill factor because of friction.

The screw blade design can be in various shapes--single, double or triple flight, single ribbon flight, variable pitch flight or tapered flight (see Figure 2.10). Although the screws are usually metal, the Lundell Corporation has developed a modular plastic screw which is assembled onto a stainless steel, mild steel or plastic hex tube with an interlocking lap joint. These screw conveyors are available in 6 inch and 9 inch diameters. They have the advantage of being light weight reducing energy needs and minimizing product breakage. The success of these plastic screws in our climate has yet to be determined.

Manufacturers such as Westfield now have available optional bristle flighting to handle specialty crops. Industry people advise that the bristle flighting has an extremely short life and do not recommend it.

Another new product on the market is the Riede Speed Switch which senses the reduction, increase or loss of shaft rotational speed. By connecting to setting the alarm setpoints, the operator will know of problems with his machinery. Riede also makes switches to detect plugged chutes and skewed belts on belt conveyors.

The "Screwlock" replaces the traditional two-drive system with a single motor and single drive. It uses a combination of a conveyor and airlock. Oregon Industrial Machine Inc. will custom build to purchaser's requirements. Screw conveyors can be used to mix and convey product, to supply product to production machines or for extraction in a bin hopper.

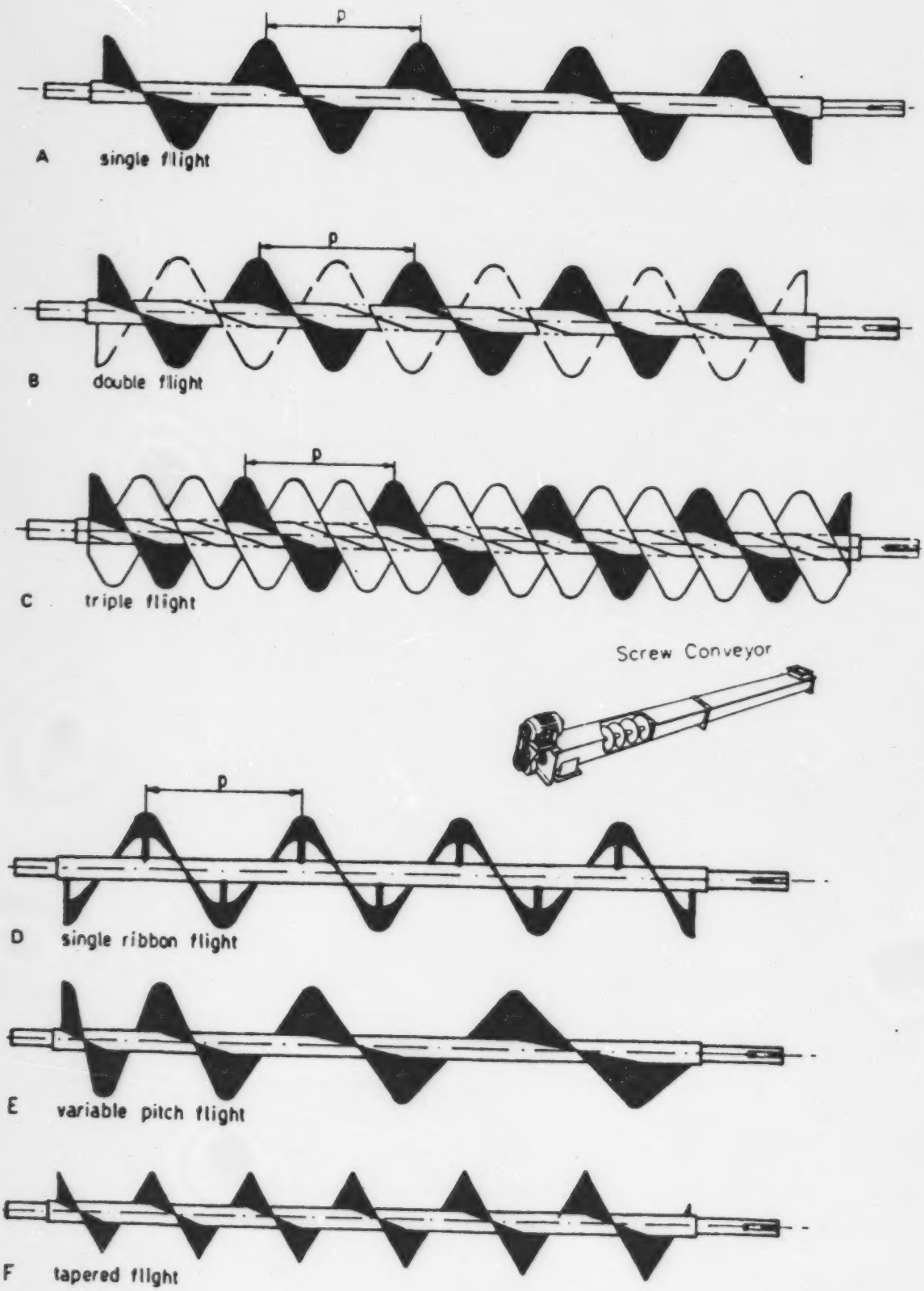


Figure 2.10: Screw Blade Designs

2.10 Pneumatic Conveying and Pumping

Pneumatic conveying is the transport of dry bulk product through pipelines by negative (suction), positive (blowing) pressure of air or a combination of the two. These systems are often used for unloading trucks, ships and barges and for the recovery of products from bulk storage.

Pneumatic conveyors came in sizes with capacities of handling up to 150 tonnes per hour. These smaller self-contained units on wheels are portable and are powered by a diesel engine. These mobile units could be used to load rail cars directly from the truck as well as filling storage facilities.

Problems associated with pneumatic systems are the high energy use required to move the product, the high cost of systems to handle 5,000 bushels and up, and the variability in trying to achieve the correct mix of air and product to move it along the system (the level of air required varies with crop, its moisture content, amount of elevation, etc.). A new product on the market to address producer concerns regarding grain damage is the plastic cyclone. The manufacturer advises that with the correct grain fill and the use of a plastic cyclone, the level of grain damage is minimal.

2.11 Transfer Chutes

Gravity plays an important role in the transfer of grain from loading spouts to silos, to discharge chutes and to chutes between different conveying items. Circular chutes are the cheapest solution because of the wide range of standardized round pipes available. In a circular chute, the grain moves at different speeds with the layers on the surface travelling the fastest. For steady flow, rectangular chutes are preferred. A rectangular chute has most of the friction loss due to product sliding against the bottom and the sides. Abrasion in the chutes can be reduced by using ceramic chip or urethane liners. They can be attached with bolts, self drilling metal screws or glue, in some cases.

To reduce the flow velocity and to minimize dust emissions, dead boxes may be used to slow the product flow down. Wear plates act as a cushion to extend the useful life of the dead box.

Many track loading sites use gravity to move product from the bucket elevator through the distributor and into each bin. By doing this, the system requires less power and less maintenance.

2.12 Directing Devices

Directing devices can be as simple as a two-way slide or flap box to the multiple pendulum or swivel spot distributor. These constructions are often used to direct grain to several bins. Product flow does not have to be interrupted if the system is a double pendulum multiway distributor. Rotary or turnhead distributors are available in sizes with 6 inch to 16 inch diameter spouts with 45°, 50°or 60° slopes. These units can handle up to 60,000 bushels per hour. Standard features are inspection doors for access to internal parts, and easy clean-out design. They can have remote or manual controls. Problems associated with the use of distributors are the need for support cables. Accidents have occurred where the cables have been caught up in trucks. Industry sources who design sites do not recommend bucket elevators and distributors for producer track loading sites. A distributor necessitates placing the bins in a circular patter. These patterns tend to limit one's ability to expand an operation.

A new product just on the market is the double swivel loadout spout which allows the operator to load a hopper car without having to move the car. It has extra heavy duty sealed bearings and standard abrasion liners for a longer life.

2.13 Comparison of Conveyors

Table 2.1 provides a comparison of conveyor suitable for a producer track loading site.

Table 2.1: Comparison of Types of Conveyors Suitable for Track Loading Sites

	Portable Auger	Screw Conveyor	Bucket Elevator	Chain Conveyor	Belt Conveyor	Portable Pneumatic
Capacity (bu/hr)	400-10,000	100-4,000	85-40,000+	500-20,000	300-50,000+	800-5,000
Application	hortizontal or vertical	horizontal or slight incline	vertical	horizontal or slight incline	horizontal or slight incline	horizontal & vertical
Power Required (hp/1000bu/10ft)	1.2-1.8	0.5-0.9	0.4-0.5	0.4-0.5	0.15-0.17	5 and up
Wear Factor	med/high	low	low	med	low	med
Maintenance	med	low	low	low	low	med
Cleanability	poor	poor	good	fair	excellent	self-cleaning
Conveyor Length (ft)	up to 70	up to 300	up to 200	up to 300	up to 1,500	100
Grain Damage	med/high	med	low	low	nil	low*
Initial Cost/Tonne	low	low/med	med/high	low	high	med/high
Operating Cost	med	low	low	low	low	med/high

*low for plastic cyclone: high for metal cyclone.

III. Bulk Weighing Technology

Accurate weighing is important at a grain handling facility. Scales used in commercial transactions such as buying, selling or paying for services rendered are subject to the regulations of the Weights and Measures Act. Accurate scales are also important if product leakage from the hopper car or train derailment necessitates verification of the volume of grain loaded. Existing producer track loading sites have had this occur on more than one occasion.

Weighing can be continuous or in-motion such as on a belt weigher while the product moves or it can be discontinuous or static weighing in a bin. In-motion weighing is recommended for inventory control but not for transactions as it has less accuracy and reliability. Belt tensions, belt stiffness and the degree of misalignment between the scale idlers and adjacent idlers affect the accuracy of continuous weighing systems. One producer track site used a belt weigher but found that the vibration and belt tension created 10% variation in the accuracy of the unit. This system was replaced within the first few months. Static weighing is the preferred method of weighing grain, with accuracies of within 0.1% obtainable. This level of accuracy is essential for commercial trade. Less accurate, lower cost bulk weight scales are available. However, the recorded weight is not recognized as legal for trade and can be rejected by the railway as proof of the number of bushels loaded.

The required accuracy, operating speed, size of the hopper, sensing method and read-out devices all influence the type of weigher selected. Weighing equipment only operates properly when the product flows in a consistent stream.

One can either weigh the truck on a fully electronic steel or concrete deck before and after unloading or move the grain to a bulkweigher. Systems which weigh each truck axle and then sum the figures to obtain a total truck weight are not legal in the trade. Despite this, many track loading sites use these scales. Truck scales can have a dump pit either above or below ground. Above ground dump pits are favoured for small operations due to the ease of construction and clean-

out.

Hoppers designed to handle large weights can be sensed in various ways:

(a) a compound level system has a lever which senses the added weight and transmits the effect to a dial,

(b) the hybrid system involves a load cell mount at the output lever. The lever system supports the load while the load cell senses the weight which is transmitted to an electronic printer, and

(c) the full load cell system has the hopper suspended by rods attached to the load cells or is set directly on the load cells. The output of the load cells is summed and transmitted to the electronic printer.

Interventing should be used for bulkweighers where grain is discharged in surges (see Figure 3.1). This will minimize dust emissions.

In general, the industry favours the use of load cell systems because levers can be costly and require extensive maintenance due to dust accumulation. This technology in combination with new computer technology can streamline the grain receiving operations. Once the data is entered, all the information regarding each customer can be automatically posted to the accounting system and a single scale ticket can be printed.

Discussions with one industry source indicated preliminary research into the development of a low profile load cell scale. This scale will be capable of achieving weighing capacities double current levels. It will stand only ten to twelve feet off the ground compared with existing units which are eighteen feet tall. Because of its design, one can auger into it for weighing and then auger to the hopper bins, eliminating the need for an expensive bucket elevator. Maintenance and verifications by Weights and Measures will also cost less than for an elevated scale. This option is worth further investigation with the manufacturer as it provides a practical solution and minimizes handling equipment needs.

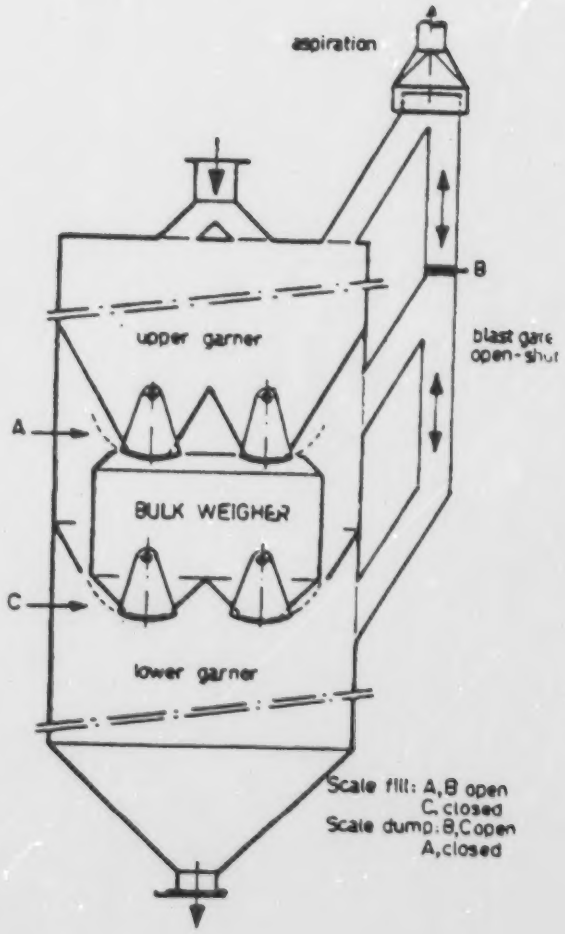


Figure 3.1 Bulkweigher with Intervent System

In addition, the manufacturer of the bulk weigher can install a bar code identification system which can be linked electronically to the scale. Under this option, each producer would be given a plastic card with his bar code on it. The card would be swiped through the scanner where it would automatically record the producer's name, eliminating the need for delays in unloading, minimizing manual recordkeeping and simplifying bookkeeping. Similar systems have been used at the Manitoba and Alberta sugar beet processing plants. They use the scanning system to not only record the producer's name and address but also the field the sugar beets came from. The scanner, at a cost of approximately $10,000, would be a valuable addition if a large number of producers were using a track loading site.

IV. Other Required Equipment

Towers and manlifts for personnel to service the bucket elevator are essential for an efficient operation. Catwalks for access to conveyors to bins are also recommended. They are available in standard widths of 36 inches, 48 inches or 60 inches. Towers, manlifts and catwalks can be primed, painted, galvanized or stainless steel.

Grain cleaners are available with capacities ranging from 1,500 to 30,000 bushels per hour. The capacity of the cleaner should be selected so that it is compatible with the capacities of the other equipment. The screens should be easy to change. Gravity cleaners have the advantage of needing a minimum of horsepower to operate. Aspirator cleaners pass air through the grain to remove fine material. These systems require centrifugal fans, a discharge duct and a dust cyclone for separation of air and trash. Given that producers will be facing full WGTA rates, consideration should be given to minimizing the dockage shipped. This dockage could be sold for livestock feed. Producers operating existing loading sites suggest that a 1% dockage level can be achieved with minimal cost. However, many view that cleaning to export standards is not practical at producer loading sites.

Grain dryers are less of a necessity as most producers dry their grain on the farm before delivery. The new tower grain dryer is one of the most modern dryers available on the market. It has capacities ranging from 1,200 to 7,000 bushels per hour. The unit is a bolted, galvanized construction which has a grain meter drum that eliminates the need for sweep augers, chain drives and multiple gearboxes. Heat is recycled from cooling grain to save fuel.

Grain sampling can be accomplished using a portable probe or by using diverter-type mechanical samplers powered by compressed air or electricity. The diverter-type samplers are installed at the end of a conveyor belt or within a spot to draw a sample periodically such as the bulk weigher. A timer regulates the frequency of the samples. After the grain enters the primary sampler, it flows through a tube to a secondary sampler which reduces the sample size. This is used to determine the grain's grade. Automatic samplers produce the most representative grain samples for the least cost.

An alternative is the "Probe-A-Load" grain sampler. Probes have an arm which can be extended from 7 feet to over 13 feet. The probe can be either a core sampler of a gravity filed probe. They are free-standing and hydraulically-operated. Problems associated with probes are that they only give an indication of the quality of the product at a given location and the high cost of the units (costs start at $20,000).

Companies such as UGG are currently adjusting their elevator system to have the office and elevator separated. Under this new site design, the producer will drive to the office at the gate. A probe will sample his grain and the truck scale will record the weight. He will then drive on to the elevator where he dumps the grain. On his way out, he stops at the office to get his cash ticket with the grade, and volume information printed on it. This system will speed up grain deliveries as the cash ticket will be printed before the truck has left the elevator. Grain samples will also be taken at the elevator but these will be retained for later analysis for grade. It is not anticipated that the elevator samples will be used for the cash ticket information.

The Infratec Grain Analyzer is one of several grain grading systems approved by the Canadian Grain Commission. This analyzer tests for protein, moisture and oil. If the grain handling and transportation continues to move towards a just-in-time system, it will become increasingly important to know the quality of the grain in the bin as well as on the farm. Producers who currently have loading sites have purchased testers after the fact once they have been penalized for higher than allowable moisture content. Testers are cost-effective and necessary.

The porta-probe is a small mobile system which can be used to monitor grain quality in bins. The Infrared Instant Temperature Detection provides a mechanism to detect grain sample temperature with an accuracy of 2% within 20 to 100 degrees F. This should not be an issue if the track loading site is achieving high turnover ratios.

Car pullers are a necessity for a track loading site. Existing operators have installed them because the use of a tractor proved inefficient with only one person or because the slope of the track itself was not sufficient to simply "brake" the car. A car puller of 5 hp or 7.5 hp is recommended. Some loading sites have had to supplement the car puller with a tractor as snow is problem.

Chapter 3

Existing Producer Track Loading Systems

I. Introduction

Over the last few years, producers have opted to use producer cars in an effort to reduce their handling costs and increase their potential profit margin. Use of producers cars normally increases when grain prices are low. In some cases, producer clubs have formed in response to the loss of the local elevator (ie. elevator consolidation). In other cases, producers have opted to load their cars in competition to local primary elevator.

Track loading facilities can provide an important service in an industry which is evolving towards more elevator consolidation. These facilities, which are less expensive to build and operate, provide flexibility while maintaining farmer access to the grain handling and transportation network. Track loading facilities may be established by an individual, by a group of producers or by producers in association with an established grain company. This last situation has occurred when a grain company with no near-by facilities wishes to increase its presence in the community without incurring substantial costs. Track loading operations may well be one of the most viable, low cost alternatives available to the industry over the longer term.

Several producers and producer loading clubs were contacted to determine:

(a) their existing track loading facilities,
(b) the costs of operating their facilities,
and (c) the problems they have encountered.

This chapter is a synopsis of these responses.

II. Hugh Campbell's Site

Mr. Hugh Campbell is just in the final stages of construction of a track loading system at Qu'Appelle, Saskatchewan. He hopes to have his site operational this spring. The attached figure and pictures give a graphic presentation of Mr. Campbell's site. Construction costs are estimated at $240,000-250,000.

The facility has an above ground raised dump pit. An above ground pit was selected to facilitate clean-out and to reduce maintenance costs. From the dump pit, a belt conveyor moves the grain to a bucket elevator with a capacity of 10,000 bushels/hour. Product moves up the elevator to a load sensing bulkweigher. A computer system from the bulkweigher to the office permits printout of the amount of grain delivered. This system has an accuracy rating of 0.1% and therefore is suitable for legal trade. This is an important feature as Mr. Campbell will be purchasing grain from producers as well as acting as a producer car agent. From the weigher, grain moves by conveyor to one of four steel Buhler storage bins. Each bin with its concrete foundation has a capacity of 25,000 bushels.

When loading a hopper car, a bin sweep inside the storage bin moves product onto a belt conveyor system located underneath the concrete floor of the bin. The conveyors from the bins which were manufactured by Ken's Custom Manufacturing Ltd. are interconnected in a horizontal system with the belt from one bin dropping grain onto the belt going under the adjacent bin. Product moves to the elevation leg (bucket elevator) where it is raised, reweighed and discharged through a downspout into the hopper car. A car puller (yet to be installed) will be used to position the hopper car for loading.

The total system is designed to handle 10,000 bushels/hour or load three hopper cars/hour. With its available seventeen car spot and access to an additional twelve car spot, this facility has the potential of being able to take advantage of incentive rates for multiple car spots by loading up to 24 cars in an eight hour period.

Mr. Campbell plans in the future to install grain cleaners and four 4,000 bushel hopper bins for storing specialty crops.

Some drawbacks of Mr. Campbell's site are:

(a) exposure of conveyor belts to the elements and debris.

(b) storage bin capacity exceeds the capacity of a hopper car. This would result in storage of several producers' grain in one bin. Given the inability to keep the product segregated, regulatory agencies will insist on a grain elevator license and assurances that identical grades and types of grain are stored together. This may not result in maximum usage of the storage available.

(c) installation of the more expensive belt conveyors to the 25,000 bushel bins. If these bins are used to store only wheat, barley or canola, then the product could have been moved using screw augers at a fraction of the cost.

(d) steel storage bins are difficult to clean out. The bin sweep leaves a residue of about an inch or so, requiring manual shovelling of the balance of the grain.

Positive features of Mr. Campbell's site include:

(a) the belt conveyor system will minimize grain damage. This is particularly important for specialty crops such as peas for human consumption.

(b) the bulkweighing system is accurate for commercial trade and provides an important verification of the amount of product loaded into a hopper car in the event of a derailment or

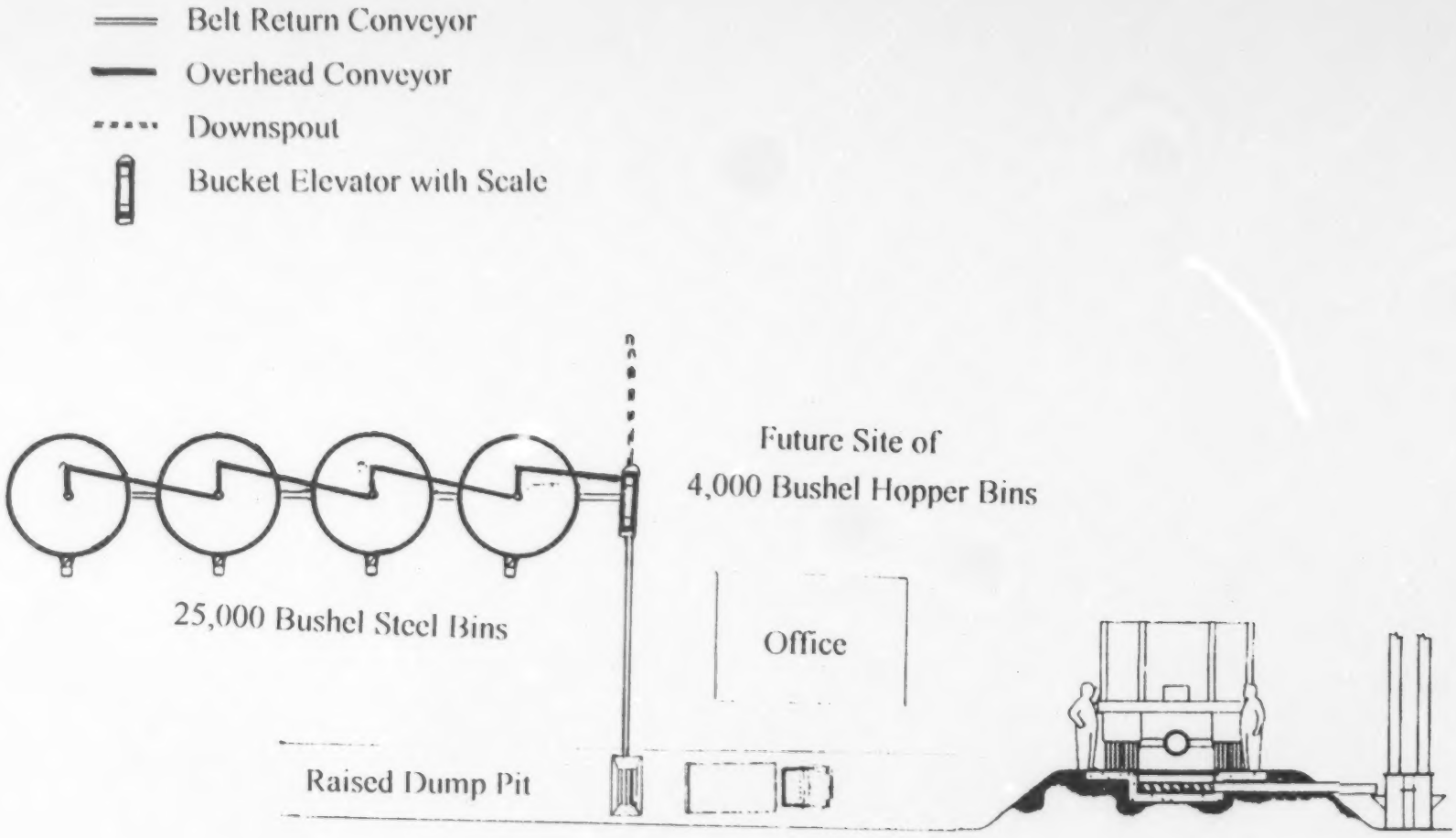
seepage of product.

(c) the site is capable of loading 10,000 bushels/hour and as such can capitalize on any incentive rates for multiple car spots.

(d) the land was purchased at a very reasonable cost and problems associated with loss of a lease have been avoided.

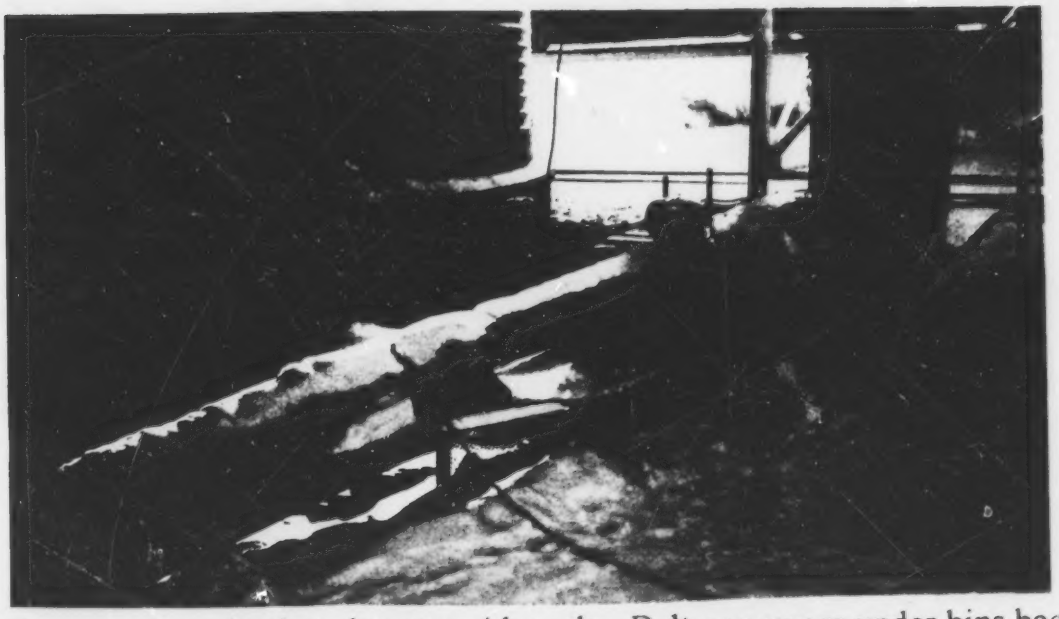
(e) installation of a grain cleaner would reduce the amount of dockage shipped to export position and would provide a source of revenue from the sale of screenings.

(f) installation of a structural tower for the bucket elevator has eliminated the need for supporting wires. This avoids problems with ensuring equipment is clear of the wires.

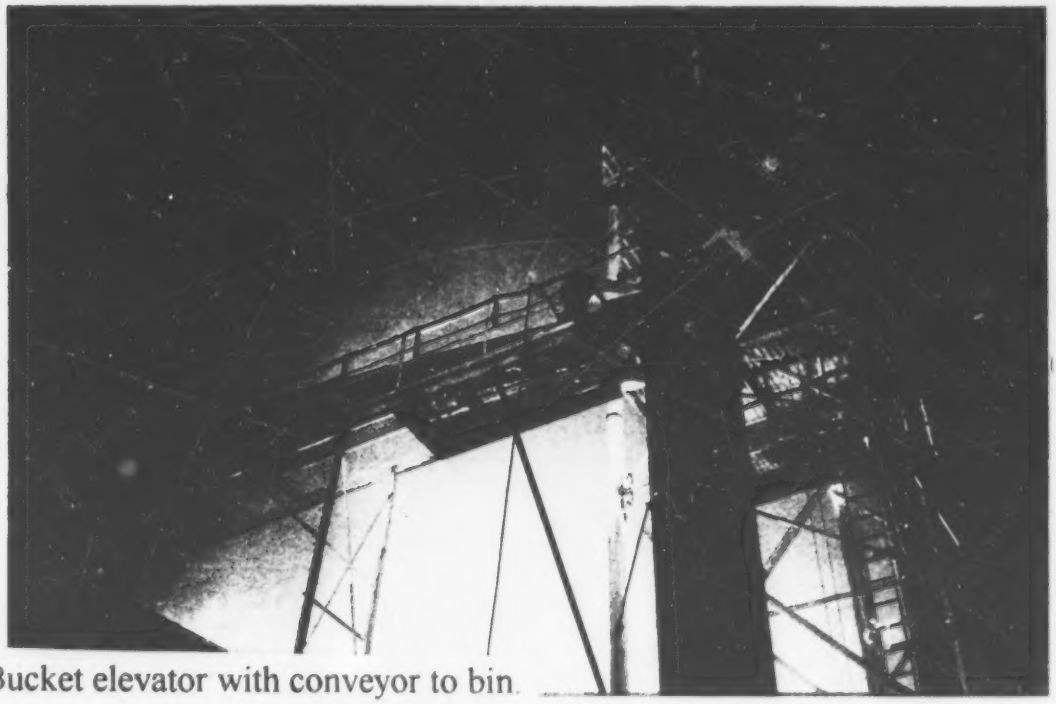


HUGH CAMPBELL'S SITE

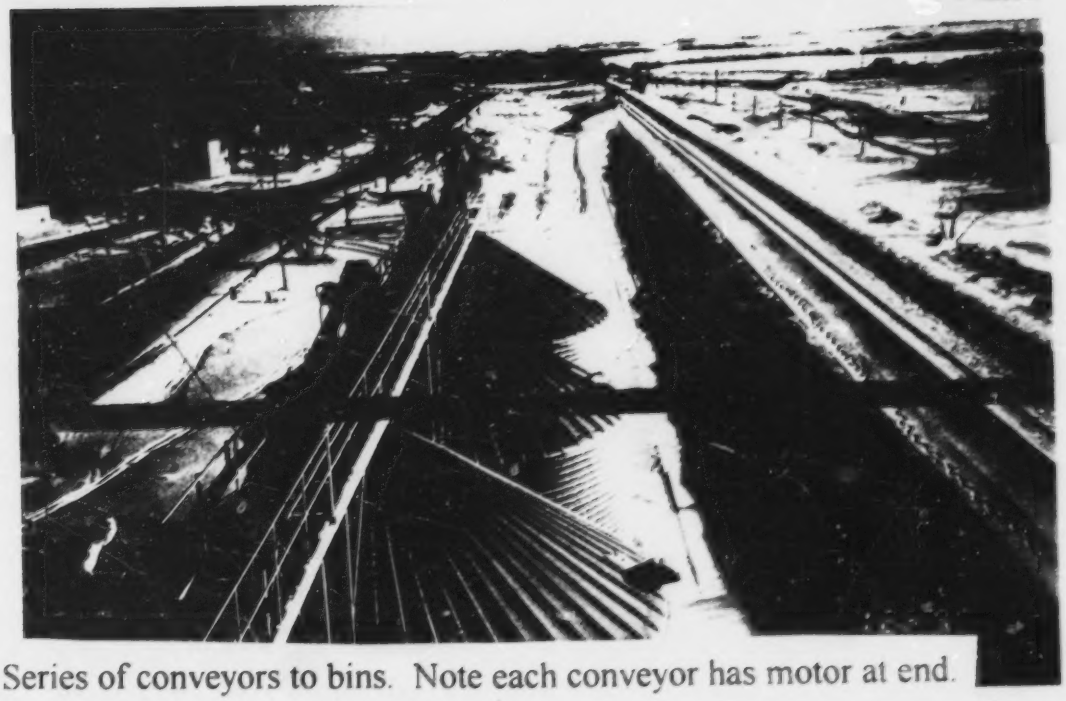
HUGH CAMPBELL'S SITE



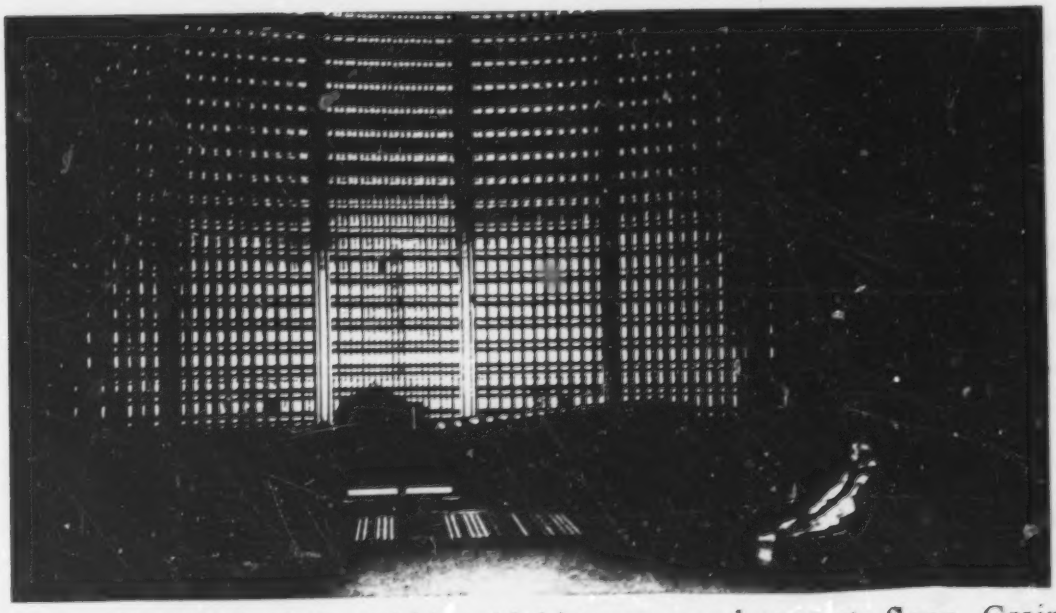
Belt conveyor to bucket elevator with scale. Belt conveyors under bins back to bucket elevator for loading hopper cars.



Bucket elevator with conveyor to bin.



Series of conveyors to bins. Note each conveyor has motor at end.



Inside of 25,000 bushel steel bin with bin sweep and concrete floor. Grain falls through centre area to belt conveyor below.

Belt Conveyor between Storage Bins

III. Paul Orsak's Site

Paul Orsak operates a commercial track loading site at Binscarth, Manitoba. Last year he loaded 300 hopper cars. Mr. Orsak has several "regular" customers who pay him a fee of $2.00/tonne to custom load a producer car. Since his establishment was built, the local Manitoba Pool Elevator (MPE) agent has become more aggressive to gain producer car loadings. MPE now waves any fee (including the administration fee of the CGC) to entice producers to use their facility. Mr. Orsak has had to counter this by convincing the company handling the grain at the export position to reduce their fees and by emphasizing the service and marketing aspects of his operation to local producers. Estimates of construction costs are $130,000-140,000.

This site has a four car spot and consists of a circular pattern of five 4,000 bushel hopper bins around a bucket elevator. Mr. Orsak designed the layout of the facilities. He originally had three 4,000 bushel hopper bins which were filled by an auger with a 180 rotating boom. Last year, he replaced the auger with a bucket elevator and added two 4,000 bushel hopper bins. He is contemplating adding several 10,000 bushel storage facilities to provide longer term storage instead of storing on farm. Each of these larger facilities would assigned to one producer.

Upon arrival at the track loading facility, the producer moves his truck into position so that an axle scale can record the weight for each axle and sum them to give a print-out of the total amount of grain delivered. He then selects the bin number (or direct loads to track) on the rotating dial beside the bucket elevator. Once this is done, he can unload his grain into the dump pit. The dump pit uses a gravity fill technique to move grain into the bucket elevator. The elevator is ten feet below ground and about ninety-five feet above ground. Its capacity is 6,000 bushels/hour. The distributor at the top of the elevator uses gravity to move product into the bin. Because of the use of gravity, the total system uses only one motor. The distributor has six outlets, allowing the addition of one more hopper in the future. The structure is stabilized with the use of high tension

wiring.

Because of the layout of the bins, there are a number of return screw augers. A central auger connects to the middle bin. The two bins on each side of this middle bin have short augers which move grain into the larger central auger. However, the bins on either side of the bucket elevator have their own augers which move grain directly into the bucket elevator for unloading. Grain moves back up the bucket elevator and out the downspout to the hopper car.

Some drawbacks associated with Paul Orsak's site are:

(a) the loading site has only a four car spot and the surrounding property (roadway) prevents expansion.

(b) the layout of the hopper bins in a circular pattern is not effective in reducing costs of conveyors or expanding storage capacity.

(c) the capacity of the bucket elevator far exceeds what is necessary given a four car spot.

(d) the axle scale is not for legal tender and, as such, the railway could reject any figure submitted for compensation due to derailment or seepage of grain.

(e) supporting wires for the bucket elevator could potentially be a safety problem. Note: Mr. Orsak has avoided this to a large degree by attaching the wires to metal beams held in concrete about fifteen feet above ground.

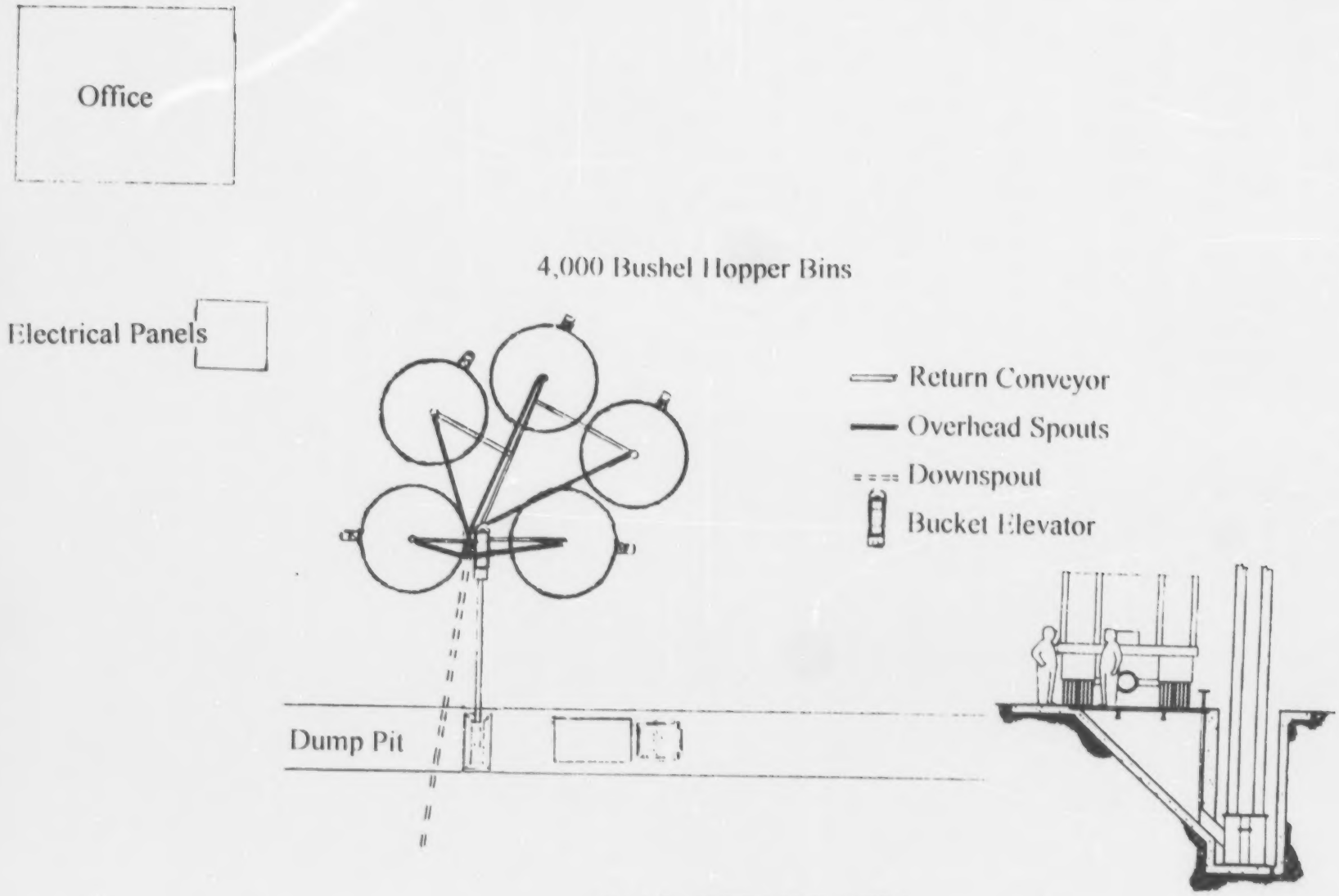
Positive features of Paul Orsak's site are:

(a) use of gravity has minimized the use of electric motors and reduced operating and maintenance costs.

(b) use of epoxy lined hopper bins has minimized clean-out of the storage facilities.

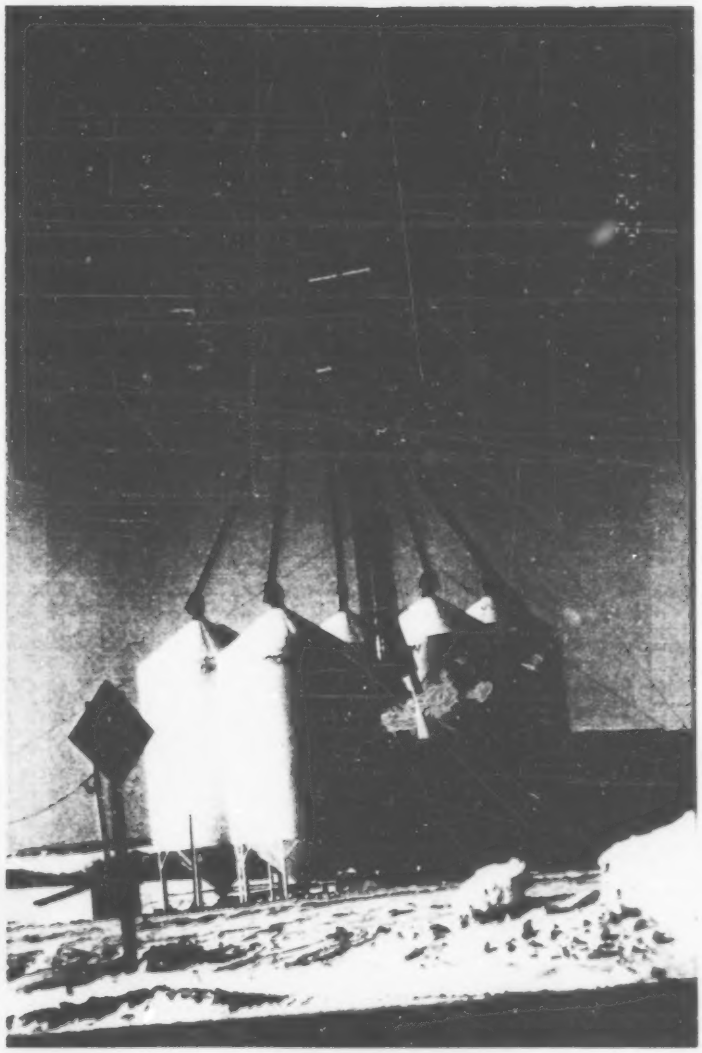
(c) having 4,000 bushel bins ensures that each producer's grain is kept separate. Mr. Orsak therefore does not require any license to handle the grain.

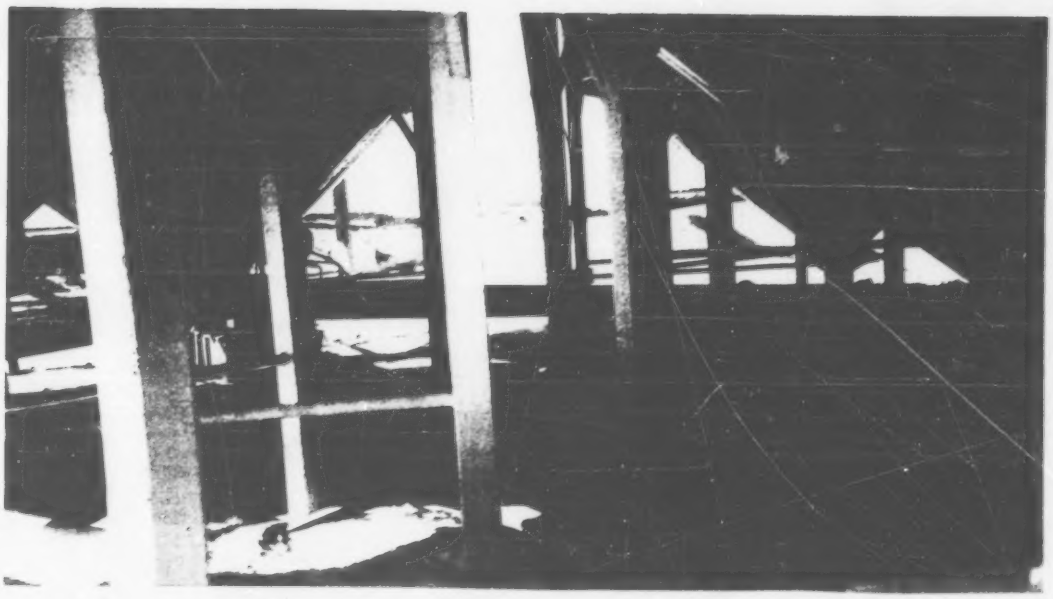
(d) to avoid problems associated with leasing the site, the structure can be dismantled and moved. Even the office is on skids.



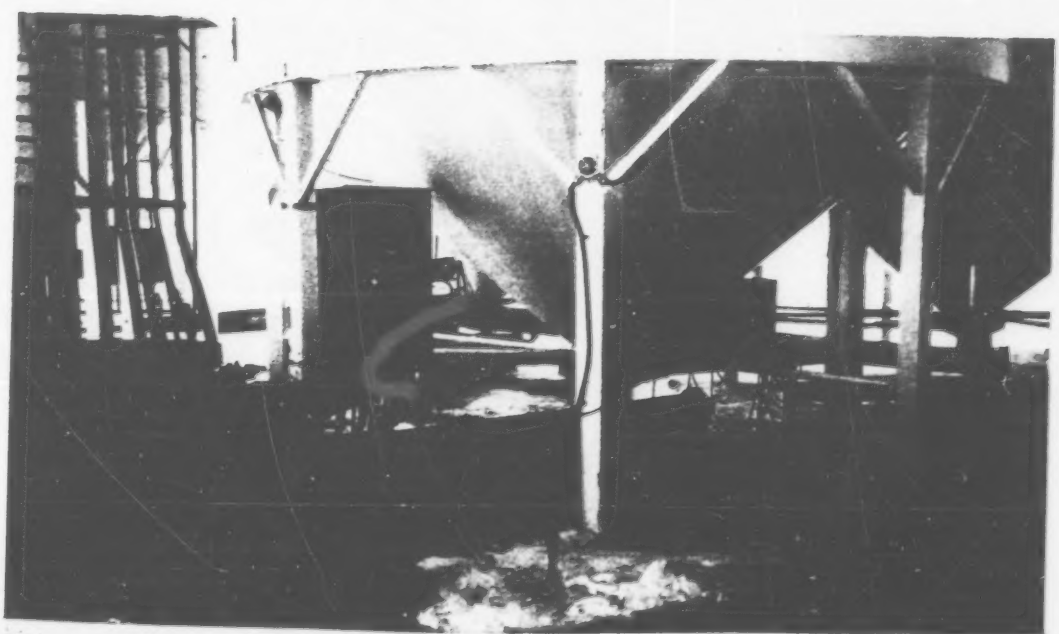
PAUL ORSAK'S SITE

PAUL ORSAK'S SITE

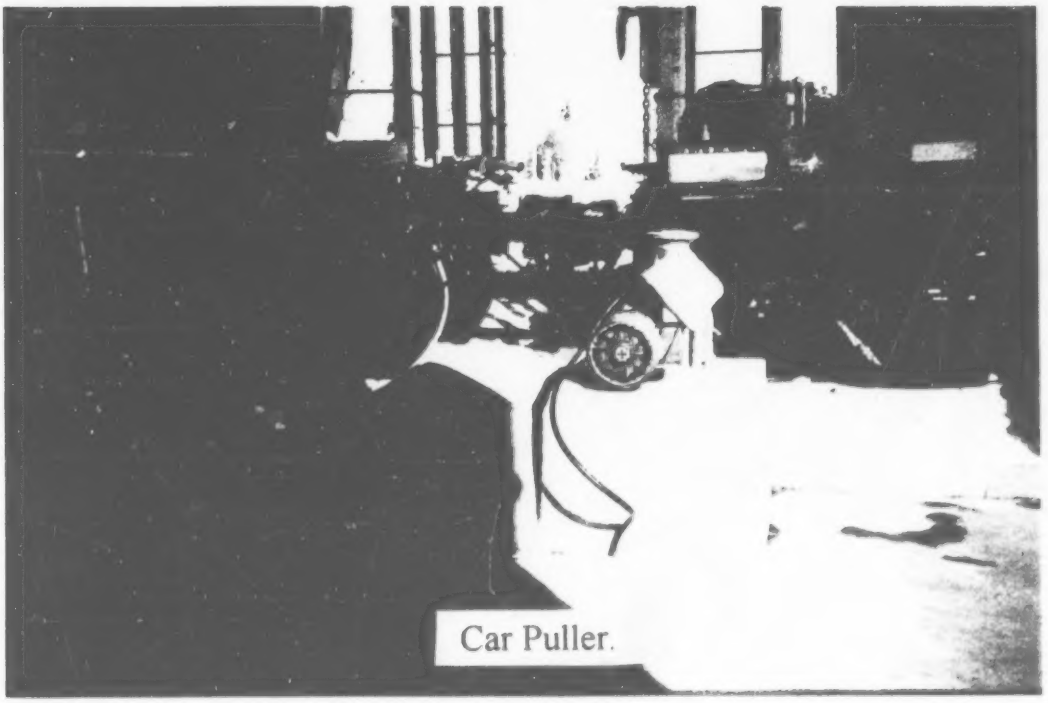




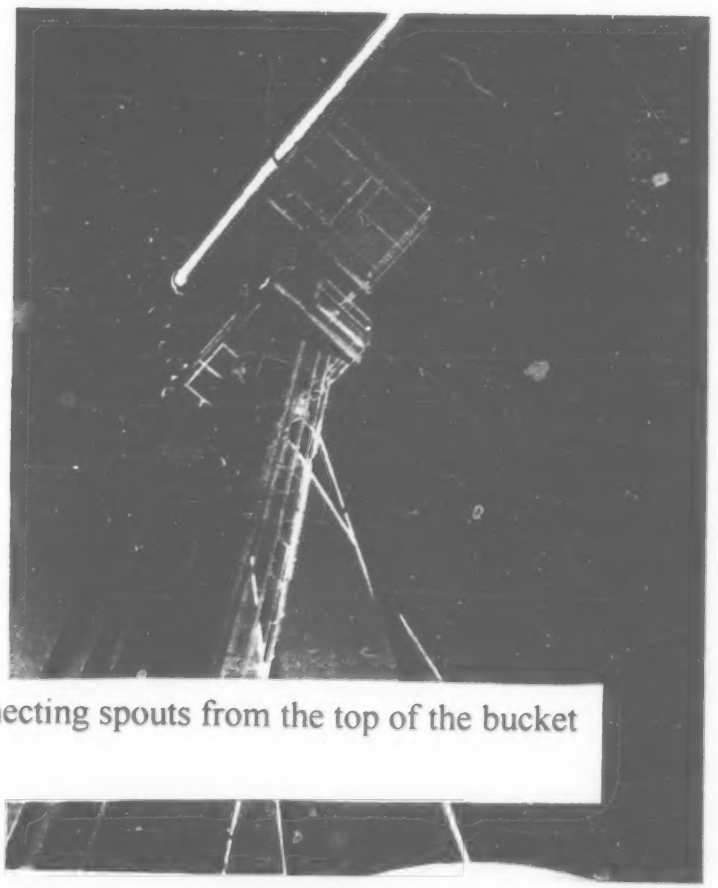
Conveyor and connecting augers from two other hoppers. Two hoppers feed directly into the bucket elevator.



View of direct connection into bucket elevator from one of two hoppers.



Car Puller.



View of the distributor and connecting spouts from the top of the bucket elevator.

IV. Gary Nestibo's Site

Gary Nestibo along with his three cousins operates a track loading site at Deloraine, Manitoba. The site which has a five car spot was constructed in 1987 at a cost of $64,856.00. Estimated replacement cost is $100,000-110,000. Since that time, it has handled over two million bushels of grain. Last year, they shipped 150 producer cars. The U-trough above the storage bins and from the storage bins to the hopper car was replaced last month at a cost of $5,000. Gary Nestibo estimates the break-even to cover their operating costs at $90 per car. They charge themselves $125 per car to build up a contingency fund to help with equipment replacement.

Prior to 1994, this site did load cars for other producers at a cost of $200 per car. However, the town insisted that the facility obtain a business license to operate. The cost of this license at $1,200 made loading of other producers' cars not a viable option and so, they have discontinued this service.

The facility consists of four 3,800 bushel Lode King hopper bins with eye level indicators and epoxy coating inside. Although they have an axle scale, they do not use it and intend to sell it. Grain is dumped into a pit and moved by inclined screw auger to a second auger seventy-one feet in length which connects to the U-trough above the bins. Each bin is owned by one of the four partners. This ensures no mixing of grain.

When loading a hopper car, grain is moved from the bin on a U-trough to a forty-one foot auger which has a downspout to the car. Grain can also be loaded from the truck to the rail by using an auger with a swinging hopper which is connected to the same forty-one foot auger. The office is eight feet by ten feet and contains equipment to test for moisture content. Mr. Nestibo advises that they purchased the moisture testing equipment when one car exceeded the allowable amount. The penalty assessed justified the purchase of the equipment.

The facility has handled wheat, barley, canola and peas successfully. One partner

did try to unload sunflowers but the oil content gummed up the augers, necessitating expensive clean-up.

They are currently trying to negotiate the purchase of the land. However, the railway is not very interested. Mr. Nestibo suggests a producer purchase the land before committing any expenses on the facility.

Some drawbacks of Gary Nestibo's site are:

(a) limited car spot prevents obtaining incentive rates.

(b) the number of storage bins is less than the number of car spots.

(c) the axle scale is not for legal tender and could be rejected by the railway as proof of product loaded.

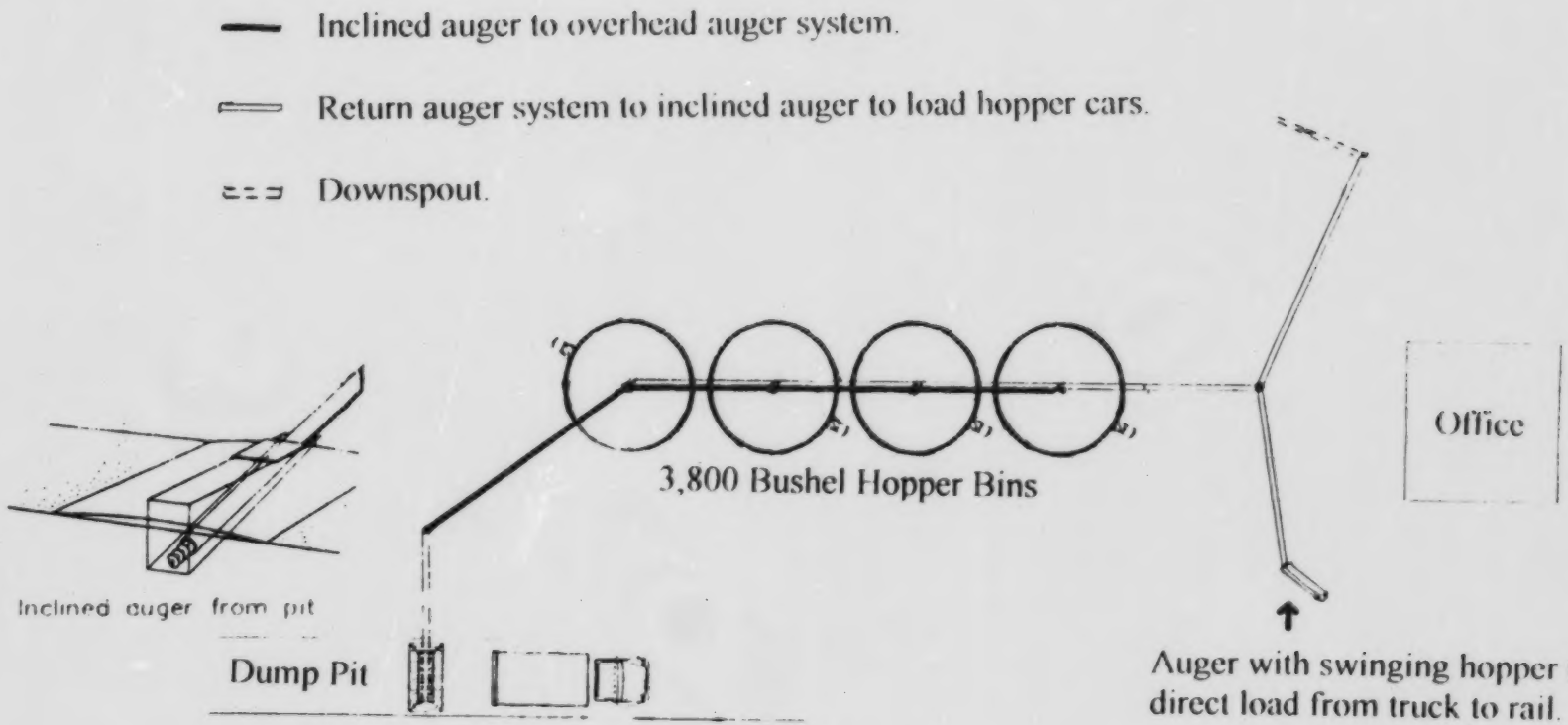
(d) delayed purchase of the land could result in a higher price or else an ever escalating lease rate.

Positive features of Gary Nestibo's site are:

(a) the facility was designed so if it was not successful each partner could keep an auger, some U-troughing and a storage bin. This minimizes the loss incurred and maximizes the salvage value.

(b) the facility has been designed so each partner can secure (lock) his own storage bin preventing any tampering.

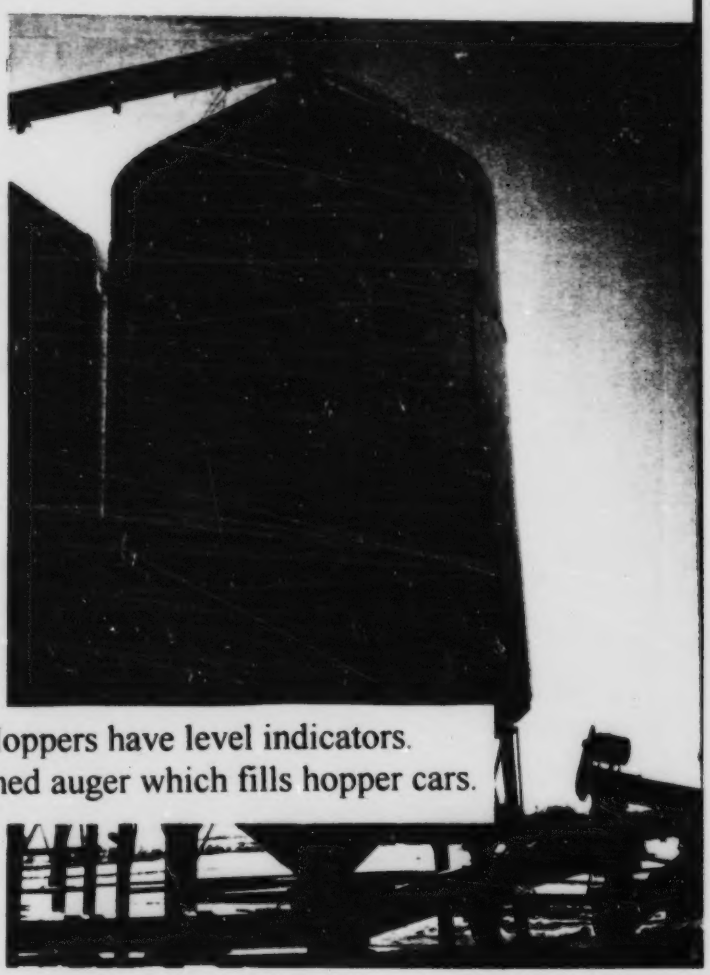
(c) the facility, including the office, can be moved.


Inclined auger to overhead auger system.
Return auger system to inclined auger to load hopper cars.
Downspout.
3,800 Bushel Hopper Bins
Office
Inclined auger from pit
Dump Pit
Auger with swinging hopper to direct load from truck to rail.

GARY NESTIBO'S SITE

GARY NESTIBO'S SITE

Auger to hopper cars. Note system allows direct loading from truck to hopper car as well as loading from dump pit into hopper bins.



Overhead auger fills hopper. Hoppers have level indicators. Auger underneath goes to inclined auger which fills hopper cars.

V. Dickerson's Site

The Dickerson's track loading site is located in the town of Killarney, Manitoba. It was built in 1994 and is used only by the Dickerson family. Estimated construction cost is about $150,000.

The site has a screw auger with a swinging hopper for receiving grain. Grain is moved by this auger into a bucket elevator where it goes down a distributor to either (a) a 25,000 bushel bin or (b) one of four 4,000 bushel bins. Grain can also be direct loaded into a hopper car. Augers underneath the bins move the grain back to the bucket elevator for loading hopper cars.

The site is adjacent to other grain companies and arrangements can be made to use additional trackage. This site has a six car spot.

Some drawbacks of Dickerson's site are:

(a) no weigh scale to record grain moved into hopper cars.

(b) yard requires gravel to stabilize for spring use.

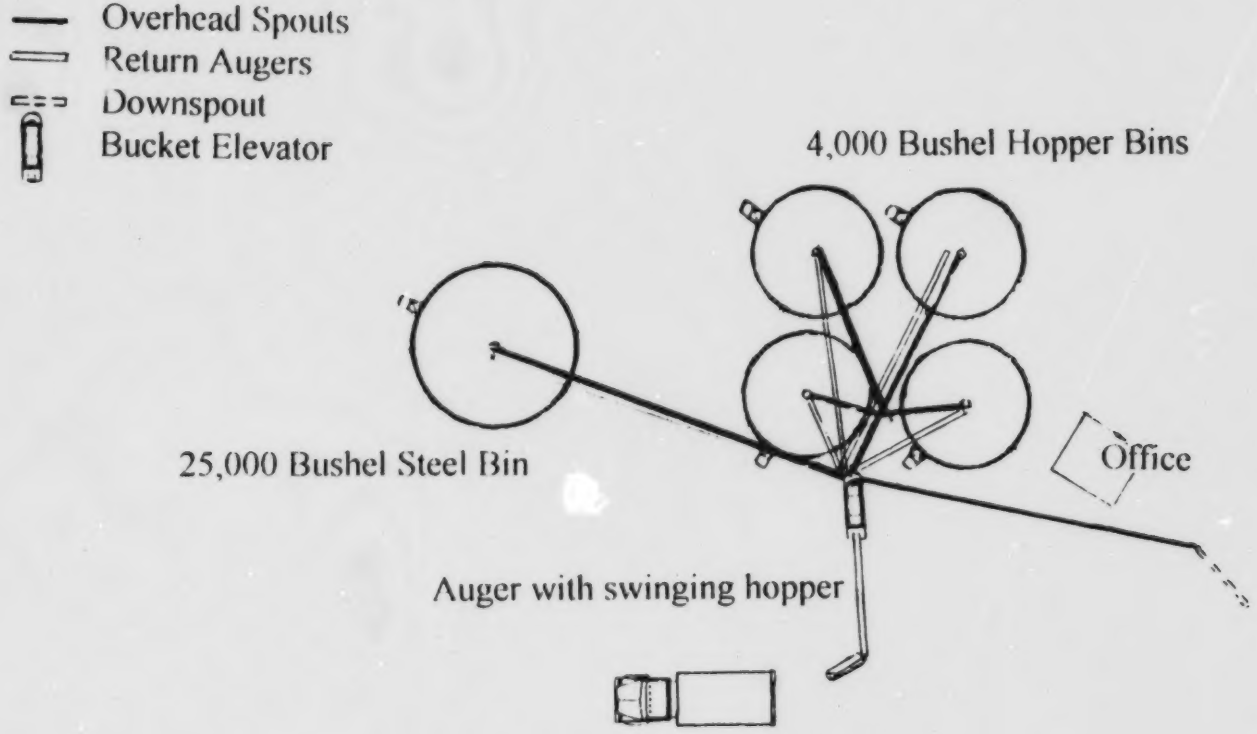
(c) supporting wires required for bucket elevator could be a hazard to other equipment.

Positive features of Dickerson's site are:

(a) as the grain is from one farm only, the CGC will not require licensing despite the large steel storage bin.

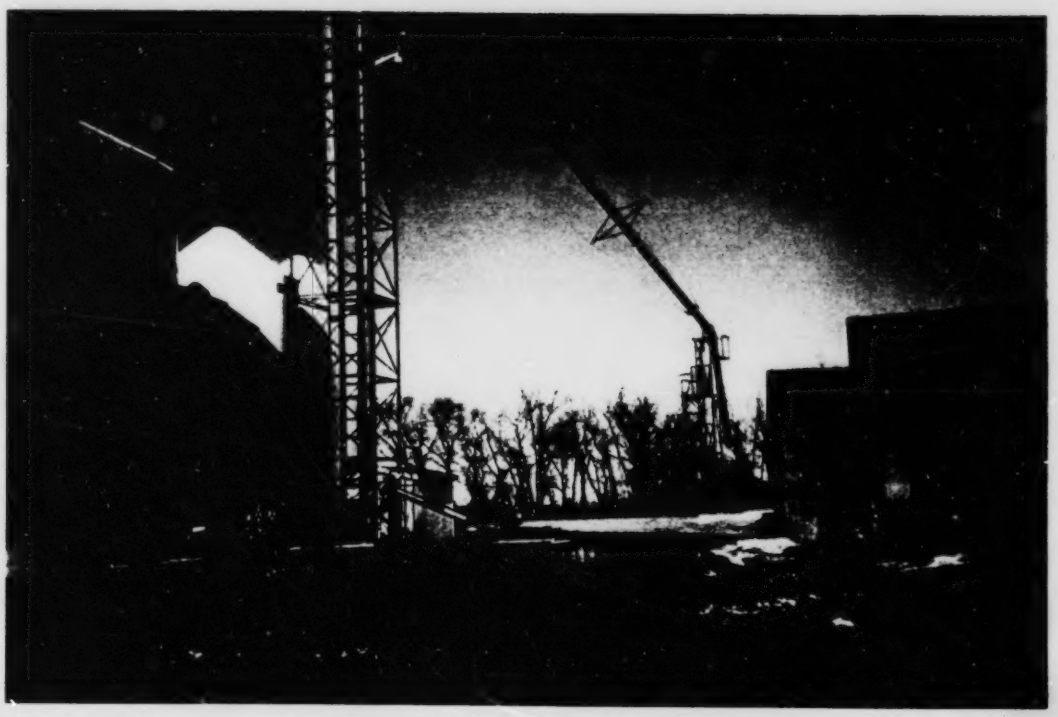
(b) like Gary Nestibo, as this operation does not do custom work, no business license was necessary.

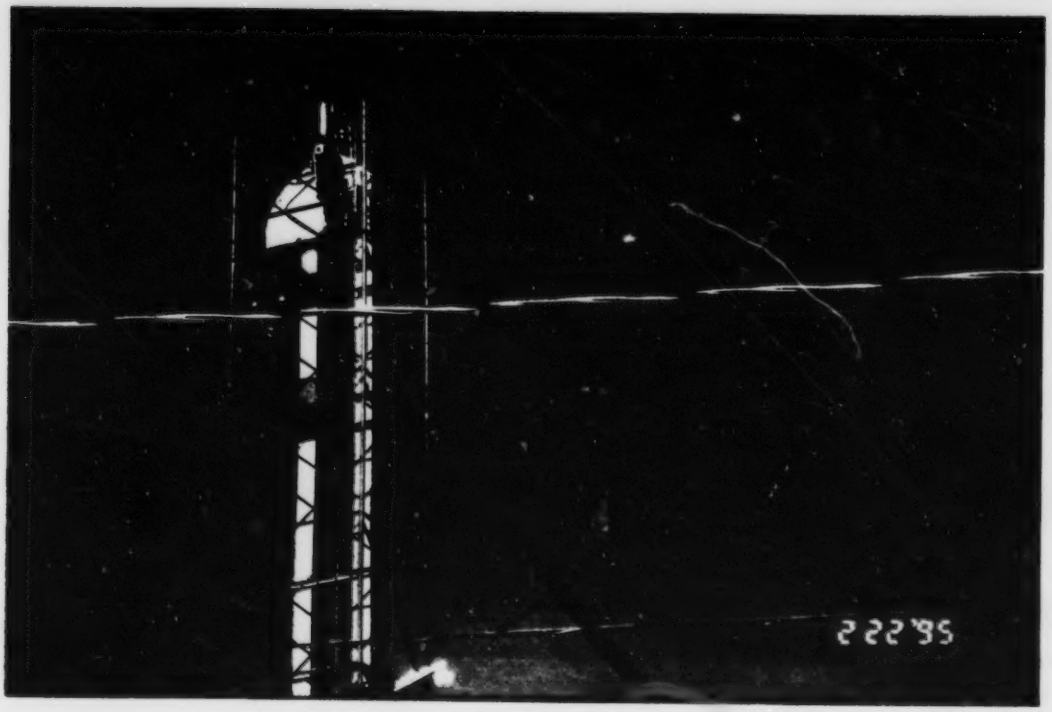
(c) additional usable trackage is available.



DICKERSON'S SITE

DICKERSON'S SITE





VI. Grant Boxall's Site

Grant and Jim Boxall own 51% of the track loading site at Tisdale. In total, six families participate in this operation. Trail-Rite of Tisdale designed and built the facility in 1987 at a cost of $125,000. Since that time Trail-Rite has been sold and re-named Northern Steel. Cost estimates to construct this site now would be about $150,000-160,000, assuming only an axle scale.

This facility has a six car spot which can be expanded to twelve. Grant Boxall was the only producer surveyed who had a housed dump pit. The housed dump pit has an attached heated office to complete the paper work in. Originally, this site had a weigh system which weighed the grain as it moved along the belt conveyor. Problems with accuracy due to belt tension and vibration necessitated replacement of this system. The facility now uses an axle scale to determine the weight of the grain. A belt conveyor moves the grain from the dump pit to a ninety foot bucket elevator with a capacity of 4,000 bushels/hour. The site now has four 3,800 bushel hopper bins for storage. Space is available for two additional storage bins. When grain is to be loaded into hopper cars, it moves by belt conveyor from the storage bins back to the bucket elevator and out to the track site through a downspout.

Last year, the site loaded 125 hopper cars. They charge $2/tonne to use the facility, whether you are a member or not. Grant Boxall indicated he was disappointed with the lack of producer response to use producer cars. Crops moved tend to be mainly wheat and canola although some peas have been shipped. The site is leased from CN Railway. The railway was unwilling to lease to producers and, so the group teamed up with Palliser Grain to arrange the leasing of the site. They are now considering purchase of the site. Palliser Grain collects the loading fees and acts as administrator for the producer cars. The group is currently re-assessing their relationship with Palliser Grain. An independent grain dealer with connections with Patterson Grain and Dreyfus has set up in Tisdale and is seeking their business.

Some drawbacks of Grant Boxall's site are:

(a) hopper bins are 3,800 bushels. Most operators prefer the 4,000 bushel size just in case a producer miscounts on the number of truck loads delivered.

(b) the housed dump pit costs about $12,000 to build. Most operators prefer to invest the money in storage facilities instead.

(c) the number of storage bins is less than the number of car spots.

(d) the capacity of the bucket elevator would prevent loading of more than eight hopper cars in an eight hour period. This would preclude capitalizing on the additional six car spot available.

(e) the site is leased and a large portion of the facilities are "fixed".

(f) the scale is not for legal tender and readings can be rejected by the railway as verification of grain loaded.

(g) the elevator leg required supporting wires.

Positive features of Grant Boxall's site are:

(a) site can be expanded to accommodate twelve cars.

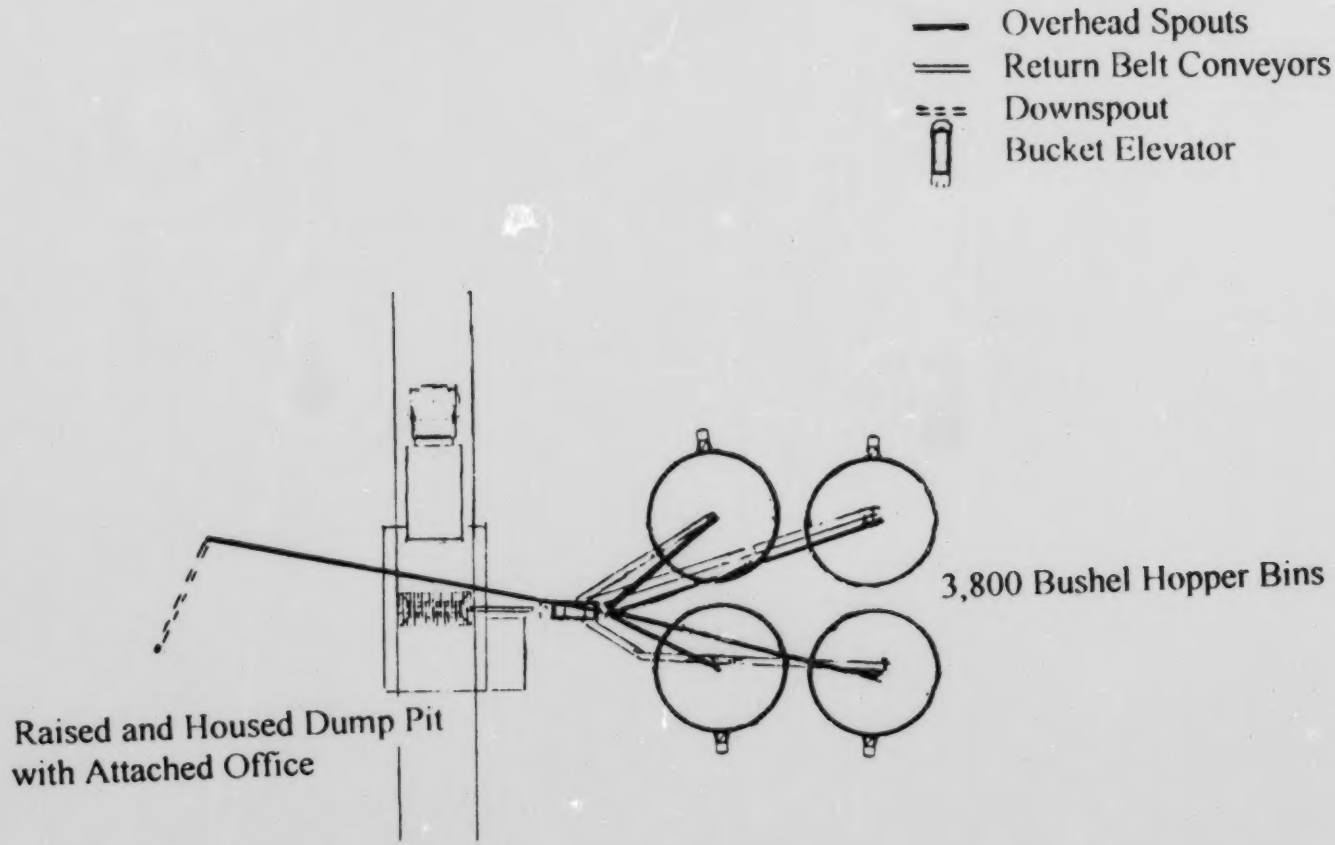
(b) dump pit is enclosed from the elements.

(c) size of storage bins ensures integrity of grain. CGC licensing

therefore not required.

(d) belt conveyors minimize grain damage and are low maintenance.

(e) system could effectively be used for specialty crops although it has only been minimally used for this purpose.



GRANT BOXALL'S SITE

VII. Bill and Art Cowan's Site

Bill and Art Cowan opened their facility in September, 1994. This facility is located on trackage outside of Hartney, Manitoba. The location provides Cowans with a twelve car spot. In addition, there is a "team" track of another twelve cars which is accessible to all producers including the Cowans. Normally the site loads seven to ten cars at a time, primarily it is the Cowan's grain. Bill Cowan advises that they charge producers only $100/car to use their facility in order to remain on good terms with their neighbours and ensure continued access to the "team" track. This charge of $100/car does not reflect any overhead costs associated with the operation.

A second hand platform scale is used to determine the tonnage of grain delivered. A portable belt conveyor with a swinging hopper is used to load grain into one of seven 4,000 bushel bins. The capacity of the belt conveyor is 6,000 bushels/hour. Despite the use of a belt conveyor, damage to peas has occurred. Bill Cowan suggested he may have to either (a) store peas with a higher moisture content to deter splitting or (b) install a bean ladder to minimize damage. A ten inch bin belt runs under four of these bins for unloading. It has a swing section which can move 180 at the end to allow bulk filling of trucks or railcars or to permit bagging of specialty crops before loading rail cars. A portable auger is used to unload the three bins not connected with the bin belt. A tractor is being used to position hopper cars but, a car puller will be installed in the spring. Total cost of the facility was $144,000.

The Cowans plan a major expansion in the spring to allow the cleaning of specialty crops to export standards. This will necessitate the purchase of at least one wind and screen cleaner and one gravity table each with a price tag of $70,000. If they intend to handle a full range of crops including canola and mustard seed, they will need two of each unit. Although they bag specialty crops now, this will become more important. When bagging a crop, the belt conveyors have to run at less than one-third capacity. Given the time consuming work of loading cars with bags, Bill Cowan anticipates they will have to build a

warehouse to stockpile bags during "down" times, thereby facilitating quicker loading. To date, this site has shipped out twenty cars of cereals and forty-four cars of bagged specialty crops.

With the new UGG facility being built at Souris, the Cowans believe that most cereal crops will be handled by UGG. They have decided to focus their operation on specialty crops (especially peas and lentils) and value-added activities (cleaning to export standards and bagging). Currently, they direct export through a broker. They have done some custom loading for other grain companies which have no elevators in the area. Generally, they have MPE administer the producer cars, except for canola which they self-administer because they feel they can realize a better price.

Bill Cowan expressed the opinion that a major deterrent to getting bigger is the licensing and bonding system in place. They lease the site and are now trying to purchase the land. Everything at the facility is on skids so it can be moved.

Some drawbacks of Bill and Art Cowan's site are:

(a) the weigh scale is not for legal tender and not acceptable for resolving disputes with the railway.

(b) conveyors are exposed to the elements.

(c) portability of equipment requires more labour input when loading grain into bins. Equipment could also require more repairs.

Positive features of Bill and Art Cowan's site are:

(a) portability of equipment means that two cars can be loaded at a time (one from the belt conveyor and one using the portable auger).

(b) cleaning and bagging is a service not available in the general area. They therefore will not be in direct competition with the local elevator.

(c) given their loading site and the "team" track, they could get incentive rates for multiple car shipments

VIII. Plains Agro Site (Bob Dyck)

Plains Agro has constructed a track loading facility in the town of Weyburn, Saskatchewan. This operation opened its doors January 1, 1995. To date they have loaded four cars and have booked an additional eleven or twelve for the next few months. Because of their late start in the crop year, about 40% of the business will be related to Board grains with the balance being flax, canola and mustard seed. In order to handle peas and lentils, the facility would require cleaning equipment.

Their site has an eight car spot with the potential to install a second set of rails. The producer dumps his grain into the pit where it moves by conveyor to a 6,000 bushel/hour bucket elevator. This elevator with a caged ladder is 75 feet tall. A distributor using gravity diverts the grain to one of four 4,000 bushel Univision hopper bottom bins. These bins are not epoxy lined. When loading hopper cars, a drag conveyor discharges each bin, moving the grain to the bucket elevator and out to the track site for loading. Currently, they are using a pinch bar to position the hopper car. A car puller and a full length B-train scale will be installed in the spring.

Plains Agro does not broker the grain. They do help the farmer to get the best price by contacting on a daily basis each of the grain companies to determine current prices. Plains Agro therefore requires only a business license to operate. The fees charged are $2.00/tonne for Board grains and $3.00/tonne for non-Board grains.

Some drawbacks of Plains Agro site are:

(a) storage facilities are less than the number of car spots.

(b) drag conveyor would damage specialty crops, especially peas.

(c) have not designed system to be flexible to handling all types

of crops. By charging a higher fee for non-Board crops, they are deterring use of the site by non-Board crop producers.

(d) bucket elevator requires supporting wires.

Positive features of Plains Agro site are:

(a) will be installing B-train scale.

(b) bucket elevator capacity is maximum required if install second set of rails.

(c) expansion at existing site possible.

IX. Rick Dobranski's Site

Mr. Dobranski has had his track loading operation located at Roblin, Manitoba for five years. Although he has an eighteen car spot, he has no facilities. All grain is augered from the truck directly to rail. He has no future plans to construct a track loading facility because of the uncertainty of the WGTA and potential increased movement of grains to the United States over the longer term.

X. Kelliher Track Loading Club (Glen Clark)

Currently there are fifteen shareholders who participate in the club. Non-patrons can also use the facility for a fee of $125/car. The club has a seven car spot and uses a thirty-five foot auger with a 7 hp motor to move the grain. Last year, they installed a used bucket elevator but they have not got it operational yet. An axle scale is used to help establish the tonnage of the grain shipped. There is no storage facility at the site.

Products shipped include Board grains, canola, peas and lentils. Some producers self-administer their cars others use elevator agents.

XI. Ted Cawkwell's Site

Five producers operated as a producer car loading group in 1986 at Nut Mountain. This line was a light steel line. About two years ago, Ted Cawkwell move to the Kelvington. He ships about forty producer cars a year. Five to seven other producers also use this location.

Kelvington has a 13 car spot with a good gravel base. Recently, someone damaged the switch and the site can only accommodate 9 cars. Producers move their augers with motors to the site to load their hopper cars.

Mr. Cawkwell does contract with specialty crop processors in Tisdale and Humbolt. In this case, they pick up the crop in his farm yard with a semi-trailer. Although he has moved some canola to the local elevator when the price was favourable, he anticipates moving more canola to the crushers in Lloydminister and Harrowby. Mr. Cawkwell plants 25% of his land to canola, 25% to peas, canary seed or flax and 50% to wheat and barley. The barley will be kept for rotational purposes and because the area is a malt barley area. The wheat can be pencilled out of his rotation any time.

Mr. Cawkwell feels that with WGTA reform many producers will want to offset the cost by using producer cars more.

XII. Tugaske Track Loading Cooperative Association (Ken McEwen)

This association has twenty members who load annually about 90 producer cars. Ken McEwen is a truck driver with a super B rig. He picks up grain from the farm and hauls it to the track site where a portable auger is used to load the cars. No plans have been made to construct permanent facilities.

XIII. Estimated Costs of Existing Track Loading Sites

The following section is based on information collected from some of the producers operating track loading sites, industry sources on costs based on site plan layouts and general costing rules based on industry experience.

A. Operating Costs

Operating costs were developed for three capacity levels---3,000 bushels/hour, 6,000 bushels/hour and 10,000 bushels/hour. Discussions with producers indicated substantially higher operating costs associated with an auger system versus a system using a bucket elevator. Operating costs for a 450 car per year

facility are assumed to be the same for 1,000 and 2,500 car per year facilities.

Table 3.1: Estimated Operating Costs for Track Loading Sites with Facilities

Operating Cost	**3,000 bu./hr. (150 cars/yr.)**	**6,000 bu./hr. (300 cars/yr.)**	**10,000 bu./hr. (450 cars/yr. & up)**
A. Bucket Elevator	$/hopper car		
Labour delivering loading cars	 18.00 12.60	 18.00 6.30	 18.00 3.60
Repairs & Maintenance	6.00 plus 2% of capital cost	3.00 plus 2% of capital cost	2.00 plus 2% of capital cost
Utilities	10.00	5.67	4.22
Other	4.00	2.00	1.22
Total "A"	50.60 plus 2% of capital cost	34.97 plus 2% of capital cost	29.04 plus 2% of capital cost
B. Augers	$/hopper car		
Auger Cost	12.45	6.67	4.44
Above "A"	50.60 plus 2% of capital cost	34.97 plus 2% of capital cost	29.04 plus 2% of capital cost
Total "B"	63.05 plus 2% of capital cost	41.64 plus 2% of capital cost	33.48 plus 2% of capital cost

Labour Costs

(a) are based on the assumptions that the "normal" truck delivery will be in 300 bushel amounts. It would therefore take twelve truckloads to fill one hopper car. Assuming ten minutes to unload a truck (six

unloads per hour) and a labour rate of $9.00/hour, it would cost $18.00/hopper car for delivery of the grain. This rate would drop significantly if five axle semi-trailer units were used as they can carry 1,000 bushels of wheat at one time. In this case, the unload rate would be about 70% of the facility's capacity to allow for time for interface with the customer. For example, a facility with 3,000 bushels/hour could handle 2,100 bushels in delivery or two semi-trailer units. A 6,000 bushel capacity facility could handle four semi-trailers per hour and a 10,000 bushel capacity facility could handle seven semi-trailers per hour. Labour costs would decline to $9.00/car for the 6,000 bushel facility and $4.90/car for a 10,000 bushel facility if only semi-trailers were used to haul the crops. When considering farm trucks, it is the length of time to complete documents which restricts the number of deliveries per hour as the carrying capacity of the equipment generally exceeds the number of bushels delivered.

(b) the capacity of the facility determines the number of cars loaded per hour. To allow for repairs and general maintenance, assume only 90% of capacity can be attained. Based on this assumption, to load a 3,800 bushel hopper car would require 1.4 hours for a 3,000 bushel/hour facility, 0.7 hours for a 6,000 bushel/hour facility and 0.4 hours for a 10,000 bushel/hour facility. Again a labour rate of $9.00/hour is used.

Repairs and Maintenance

(a) assume that general maintenance required for yard clean-up and repairs would be 2 hours/week for 50 weeks/year. This would be 100 hours annually at a cost of $9.00/hour. If a 3,000 bushel facility loads 150 hopper cars annually, a 6,000 bushel facility loads 300 cars and a 10,000 bushel facility loads 450 cars annually, then the fixed cost of this labour would be $6/car for the 3,000 bushel operation, $3/car for the 6,000 bushel operation and $2/car for the 10,000 bushel operation.

(b) general industry guidelines based on other research of elevator costs assume 2% of the capital value of machinery and buildings as being equivalent to repairs incurred annually.

Utilities

(a) producers operating track loading sites indicated that their hydro cost was basically the minimum monthly payment for those site shipping up to 150 cars. Rates were slightly higher for facilities shipping 300 and 450 hopper cars yearly. Responses suggested costs of $1,000 annually for the 3,000 bushel facility, $1,200 annually for the 6,000 bushel facility and $1,400 annually for the 10,000 bushel facility. On a per car basis, this would equal $6.66/car for the 3,000 bushel operation, $4.00/car for the 6,000 bushel unit and $3.11/car for the 10,000 bushel facility.

(b) telephone and other expenses were highly variable. They were assumed to be $500/year. This equated to $3.34/car for 3,000 bushels, $1.67/car for 6,000 bushels and $1.11/car for 10,000 bushels.

Other

(a) accounting services were usually hired by the producers for a cost of about $500/annually. Other miscellaneous expenses were assumed to be $100/annually. Based on these figures, the "other" cost would be $4/car for 3,000 bushel units, $2/car for 6,000 bushel units and $1.22/car for 10,000 bushel units.

Auger Costs

(a) some producer sites used only augers rather than bucket elevators. This was done because of the lower cost of the augers and their salvage value if the operation terminated. Information provided by these producers indicated that a 150 car operation would spend $2,000 annually for augering. Larger operations would not use

augers as much as small operations. However, it was assumed that a similar dollar annual expenditure would be incurred for the 300 and 450 car sites. This would imply costs of $12.45/car for 150 car sites, $6.67/car for 300 car sites and $4.44/car for 450 car sites.

Sites which augered grain directly from truck to rail were assumed to have two hours of labour cost at $9.00/hour and the equivalent amount in operating costs. Augering directly into the hopper car therefore cost $36/car.

B. Fixed Costs

The following are estimates of the fixed costs for the various producer sites discussed earlier in this chapter. These costs are based on producer information, and dealer costs related to each site's layout.

Hugh Campbell's Site

4 25,000 bushel steel bins @ $17,500/each	$ 70,000
elevation leg	25,000
tower for leg with manlift	20,000
raised dump pit	2,000
belt conveyors with catwalk	25,000
bulkweigher (load cell)	50,000
car puller (to be installed)	6,000
installation/concrete/electrical	40,000
office	12,500
total	**$250,500**

(a) bins, dump pit, tower and office depreciation and investment
-total value of bins, dump pit, tower and office is $104,500.
-depreciation assumes twenty years and 10% salvage value or ($104,500-$10,450)/20 years = $4,700.
-investment cost is based on 6% interest or {($104,500+$10,450)/2} x 6% = $3,450.

(b) machinery costs would include the elevation leg, belt conveyors, car puller and bulkweigher
-total value of these items is $106,000.
-depreciation assumes 10 years and no salvage value or $106,000/10 years = $10,600.
-investment cost is ($106,000/2) x 6% = $3,180.

(c) there is also an opportunity cost associated with loss investment of the money used for installation of the equipment. This cost would be $40,000 x 6% = $2,400. In addition, Mr. Campbell purchased the land for a sum of $3,500. To reflect the opportunity cost of this purchase, the formula would be $3,500 x 6% = $210.

(d) other fixed costs include land taxes, business taxes and insurance. It was assumed the cost of these would be --land tax $600, business tax $1,000 and insurance $1,800 for a total cost of $3,400.

Total fixed costs for Hugh Campbell's site are estimated at $27,940.

Paul Orsak's Site

5 4,000 bushel Uniflow bins @ $9,300/each	$ 37,200
bucket elevator	20,000
dump pit with concrete liner	6,000
augers	17,000
spouting and distributor	10,000
axle scale	6,000
car puller	6,000
office	12,000
installation/concrete/electrical	23,000
total	**$137,200**

(a) bins, dump pit and office depreciation and investment
-total value of bins, dump pit and office is $55,200.
-depreciation assumes twenty years and 10% salvage value or ($55,200-$5,520)/20 years = $2,490.
-investment cost is based on 6% interest or {($55,200+$5,520)/2} x 6% = $1,820.

(b) machinery costs would include the elevation leg, augers, spouting and distributor, axle scale and car puller
-total value of these items is $59,000.
-depreciation assumes 10 years and no salvage value or $59,000/10 years = $5,900.
-investment cost is ($59,000/2) x 6% = $1,770.

(c) there is also an opportunity cost associated with loss investment of the money used for installation of the equipment. This cost would be $23,000 x 6% = $1,380.

(d) other fixed costs include site rental, land taxes, business taxes and insurance. It was assumed the cost of these would be -- site rental $600, land tax $600, business tax $1,000 and insurance $1,100 for a total cost of $3,300.

Total fixed costs for Paul Orsak's site are estimated at $16,000.

Gary Nestibo's Site

4 3,800 bushel Lode King bins @ $8,600/each	$ 34,400
augers	20,000
dump pit	2,000
U-troughing	18,000
axle scale	6,000
car puller	6,000
office	5,000
installation/concrete/electrical	20,000
total	**$111,400**

(a) bins, dump pit and office depreciation and investment
-total value of bins, dump pit and office is $41,400.
-depreciation assumes twenty years and 10% salvage value or ($41,400-$4,140)/20 years = $1,860.
-investment cost is based on 6% interest or {($41,400+$4,140)/2} x 6% = $1,370.

(b) machinery costs would include the augers, U-troughing, axle scale and car puller
-total value of these items is $50,000.
-depreciation assumes 10 years and no salvage value or $50,000/10 years = $5,000.
-investment cost is ($50,000/2) x 6% = $1,500.

(c) there is also an opportunity cost associated with loss investment of the money used for installation of the equipment. This cost would be $20,000 x 6% = $1,200.

(d) other fixed costs include site rental, land taxes, business taxes and insurance. It was assumed the cost of these would be -- site rental $700, land tax $1,000, business tax $1,000 and insurance $1,100 for

a total cost of $3,800.

Total fixed costs for Gary Nestibo's site are estimated at $14,730.

Dickerson's Site

1 25,000 bushel steel bin @ $17,500/each	$ 17,500
4 4,000 bushel hopper bins @ $9,300/each	37,200
bucket elevator and tower	28,000
augers	24,000
spouting and distributors (2)	11,000
car puller	6,000
office	1,000
installation/concrete/electrical	25,000
total	**$149,700**

(a) bins, elevator tower ($8,000) and office depreciation and investment
-total value of bins and office is $63,700.
-depreciation assumes twenty years and 10% salvage value or ($63,700-$6,370)/20 years = $2,870.
-investment cost is based on 6% interest or {($63,700+$6,370)/2} x 6% = $2,100.

(b) machinery costs would include the bucket elevator, augers, spouting and distributors and car puller
-total value of these items is $61,000.
-depreciation assumes 10 years and no salvage value or $61,000/10 years = $6,100.
-investment cost is ($61,000/2) x 6% = $1,830.

(c) there is also an opportunity cost associated with loss investment of the money used for installation of the equipment. This cost would be $25,000 x 6% = $1,500.

(d) other fixed costs include site rental, land taxes, business taxes and insurance. It was assumed the cost of these would be -- site rental $700, land tax $1,000, business tax $0 and insurance $1,100 for a total cost of $2,800.

Total fixed costs for Dickerson's site are estimated at $17,200.

Grant Boxall's Site

4 3,800 bushel hopper bins @ $8,600/each	$ 34,400
bucket elevator	20,000
belt conveyors	30,000
spouting and distributor	10,000
housed dump pit with office	18,000
axle scale	6,000
installation/concrete/electrical	25,000
total	**$148,400**

(a) bins, dump pit with office depreciation and investment
-total value of bins and office is $52,400.
-depreciation assumes twenty years and 10% salvage value or ($52,400-$5,240)/20 years = $2,400.
-investment cost is based on 6% interest or {($52,400+$5,240)/2} x 6% = $1,730.

(b) machinery costs would include the bucket elevator, belt conveyors, spouting and distributors and axle scale
-total value of these items is $66,000.
-depreciation assumes 10 years and no salvage value or $66,000/10 years = $6,600.
-investment cost is ($66,000/2) x 6% = $1,980.

(c) there is also an opportunity cost associated with loss investment of the money used for installation of the equipment. This cost would be $25,000 x 6% = $1,500.

(d) other fixed costs include site rental, land taxes, business taxes and insurance. It was assumed the cost of these would be -- site rental $700, land tax $1,000, business tax $1,000 and insurance $1,100 for a total cost of $3,800.

Total fixed costs for Grant Boxall's site are estimated at $18,010.

Bill Cowan's Site

7 4,000 bushel hopper bins @ $9,300/each	$ 65,100
10 inch belt conveyor under bins	10,000
portable belt conveyor	14,000
portable auger	3,000
used platform scale	35,000
office	10,000
installation/concrete/electrical	9,000
total	**$146,100**

(a) bins and office depreciation and investment
-total value of bins and office is $75,100.
-depreciation assumes twenty years and 10% salvage value or ($75,100-$7,510)/20 years = $3,380.
-investment cost is based on 6% interest or {($75,100+$7,510)/2} x 6% = $2,480.

(b) machinery costs would include the belt conveyors, augers and platform scale
-total value of these items is $62,000.
-depreciation assumes 10 years and no salvage value or $62,000/10 years = $6,200.
-investment cost is ($62,000/2) x 6% = $1,860.

(c) there is also an opportunity cost associated with loss investment of the money used for installation of the equipment. This cost would be $9,000 x 6% = $540.

(d) other fixed costs include site rental, land taxes, business taxes and insurance. It was assumed the cost of these would be -- site rental $600, land tax $700, business tax $1,000 and insurance $1,100 for a total cost of $3,400.

Total fixed costs for Bill Cowan's site are estimated at $17,860.

Plains Agro's Site

4 3,800 bushel hopper bins (no epoxy) @ $8,200/each	$ 32,800
bucket elevator	25,000
spouting and distributor	10,000
conveyors	20,000
car puller (to be installed)	6,000
B-train scale (to be installed)	45,000
installation/concrete/electrical	20,000
office	12,000
total	**$170,800**

(a) bins and office depreciation and investment
-total value of bins and office is $44,800.
-depreciation assumes twenty years and 10% salvage value or ($44,800-$4,480)/20 years = $2,020.
-investment cost is based on 6% interest or {($44,800+$4,480)/2} x 6% = $1,480.

(b) machinery costs would include the bucket elevator, conveyors, spouting and distributors, car puller and B-train scale
-total value of these items is $106,000.
-depreciation assumes 10 years and no salvage value or $106,000/10 years = $10,600.
-investment cost is ($106,000/2) x 6% = $3,180.

(c) there is also an opportunity cost associated with loss investment of the money used for installation of the equipment. This cost would be $20,000 x 6% = $1,200.

(d) other fixed costs include site rental, land taxes, business taxes and insurance. It was assumed the cost of these would be -- site rental $700, land tax $1,000, business tax $1,000 and insurance $1,300 for a total cost of $4,000.

Total fixed costs for Plains Agro's site are estimated at $22,480.

Site with Portable Auger

assume portable auger valued at $3,000

(a) auger depreciation and investment
-depreciation assumes 10 years and no salvage value or $3,000/10 years = $300.
-investment cost is ($3,000/2) x 6% = $90.

(b) other fixed costs include site rental, land taxes, business taxes and insurance. It was assumed these costs would be site rental $600, land taxes $0, business taxes $0 and insurance $0.

Total fixed costs for a site serviced with a portable auger are estimated at $990.

C. Total Costs (Fixed and Variable)

Using the fixed costs identified for each site in section B and applying a realistic number of cars loaded for the year, one can determine the fixed costs per hopper car loaded. These costs can then be combined with the variable costs derived under section A to determine the total cost for each operation. Break-even analysis will be used to calculate the number of cars required to be loaded at selected fees.

Table 3.2 summarizes the total costs per car. The last two rows in the table reflect the costs if one self-administered the car or if a grain company administer the producer car. For a self-administered car, the range is from $92.22 to $240.46 ($1.05 to $2.73/tonne). For a company administered car, the range is from $217.22 to $365.46 ($2.47 to $4.15/tonne). These charges are favourable when compared to the rates elevator companies charge at the primary elevator (approximately $8/tonne). These costs do not reflect any discounts due to multiple car spotting. These discounts for multiple cars could be as large as

Table 3.2: Summary of Total Costs for Each Site

	Hugh Campbell	Paul Orsak	Gary Nestibo	Dickerson	Grant Boxall	Bill Cowan	Plains Agro	Portable Auger
Fixed Cost	$27,940	$16,000	$14,730	$17,200	$18,010	$17,860	$22,480	$ 990
Other Costs	0	10,800*	0	0	0	0	0	0
Total Fixed	27,940	26,800	14,730	17,200	18,010	17,860	22,480	990
No. Cars/Yr.	450 (low) 1,000 (med) 2,500 (high)	300	150	150	150	150	300	50
Fixed Cost/Car	62.09 (low) 27.94 (med) 11.18 (high)	89.33	98.20	114.67	120.07	119.07	74.93	19.80
Capital Cost	250,500	137,200	111,400	149,700	148,400	146,100	170,800	3,000
Repairs at 2% of Capital	5,010	2,744	2,228	2,994	2,968	2,922	3,416	60
Repair Cost/Car	11.13 (low) 5.01 (med) 2.00 (high)	9.15	14.85	19.96	19.79	19.48	11.39	1.20
Other Variable Costs	29.04	34.97	63.04	50.60	50.60	34.97	34.97	36.00
Total Cost/Car	$102.26 (low) 61.99 (med) 42.22 (high)	$133.45	$176.09	$185.23	$190.46	$173.52	$121.29	$57.00
Total-Self-admin (+$50)	152.26 (low) 111.99(med) 92.22 (high)	183.45	226.09	234.23	240.46	223.52	171.29	107.00
Total-Co. admin. (+$175)	277.26 (low) 236.99 (med) 217.22 (high)	308.45	351.09	360.23	365.46	348.52	296.29	232.00

*salaried employee for office.

$220.00/ car ($2.50/tonne x 88 tonnes per car) based on a 50 car spot. However, it is more realistic that some of these sites may be able to spot 18 cars for a discount of $132.00/car ($1.50/tonne x 88 tonnes per car).

Table 3.3 presents the break-even analysis for the producer track loading sites. The analysis considers a series of possible charges ranging from $1.25/tonne up to $3.00/tonne. If, for example, Hugh Campbell was able to realize the $132/car incentive rate, then at $1.25/tonne fee he would only have to load 139 hopper cars (figures indicated with asterisk) annually to achieve his break-even.

Table 3.3: Break-even Analysis on Track Loading Sites

	Fee Charged Per Tonne				
	$1.25	**$1.50**	**$1.75**	**$2.00**	**$3.00**
Hugh Campbell	400 139* 125**	305 125* 114**	246 114* 105**	206 105* 97**	125 79* 74**
Paul Orsak	407	305	244	203	122
Gary Nestibo	459	273	194	150	80
Dickerson	437	280	207	164	89
Grant Boxall	455	293	216	171	93
Bill Cowan	322	231	180	147	86
Plains Agro	354	263	209	174	104
Portable Auger	14	11	9	8	5

*number of cars required if incentive rate of $1.50 for 18 car spot
**number of cars required if incentive rate of $1.75 for 20 car spot

Table 3.4 indicates the storage capacity in bushels and number of hopper cars and the number of car spots at each site. Only Hugh Campbell's facility has the ability to take advantage of incentive rates.

Table 3.4: Storage Capacities and Number of Car Spots At Each Site

Site	Storage Capacity Bushels	Storage Capacity No. of Cars*	Car Spots
Hugh Campbell	100,000	26	24
Paul Orsak	20,000	5	4
Gary Nestibo	15,200	4	5 (potential 10)
Dickerson	41,000	10	6
Grant Boxall	15,200	4	6
Bill Cowan	28,000	7	12 (access to additional 12)
Plains Agro	16,000	4	8 (potential 16)
Rick Dobranski	0	0	18
Kelliher Club	0	0	7
Ted Cawkwell	0	0	13
Tugaske Club	0	0	?

Using the storage capacity in terms of number of hopper cars (assuming 3,800 bushels per hopper car) and considering the assumed number of cars loaded, one can calculate the estimated turnover ratios for each operation having storage facilities. These rates are summarized in Table 3.5. The turnover ratios range from 17.5 to 75.0. For facilities with small storage capacity, coordination of

deliveries and minimum delays in loading and shipping would be necessary to achieve these potential turnover ratios. Most facilities which have been operating for a period of time have a proven track record of these turnover ratios. For Hugh Campbell's site, three scenarios have been developed in discussion with Mr. Campbell--a low volume of 450 cars per year, a medium volume of 1,000 cars per year and a high volume of 2,500 cars per year. His site is not yet operational. The figures for Plains Agro are also based on anticipated loading rates. To date, Plains Agro is far below this ratio.

Table 3.5: Estimated Turnover Ratios

Site	Storage Capacity No. of Cars	Estimated No. of Cars Per Yr.	Turnover Ratio
Hugh Campbell	26	450 (low) 1,000 (medium) 2,500 (high)	17.3 38.5 96.2
Paul Orsak	5	300	60.0
Gary Nestibo	4	150	37.5
Dickerson	10	150	15.0
Grant Boxall	4	150	37.5
Bill Cowan	7	150	21.4
Plains Agro	4	300	75.0

Chapter 4

Demonstration Track Loading Systems

I. Introduction

The consultant was requested to provide system configuration, capital and operating costs for three demonstration track loading systems. To allow further flexibility in selecting a system, costs and system specifications were also compiled for variations on these alternative systems.

II. Descriptions of Track Loading Systems

The following information is based on bids received from several companies. Due to the variability in expenses associated with site preparation, concrete costs, electrical costs and installation, these costs are presented as estimates based on existing producer track loading systems.

A. Permanent Auger Installation

Option #1: Component Approach

This system would use the power take-off (p.t.o) from a tractor at the site. The tractor could either be retained at the site for moving snow and general clean-up or the producer could take his tractor to the site when loading. A conceptual layout of this facility is shown in Figure 4.1. It would have a capacity of 3,800 bushels per hour or one hopper car per hour.

CONCEPTUAL LAYOUT ONLY

TRACK 1

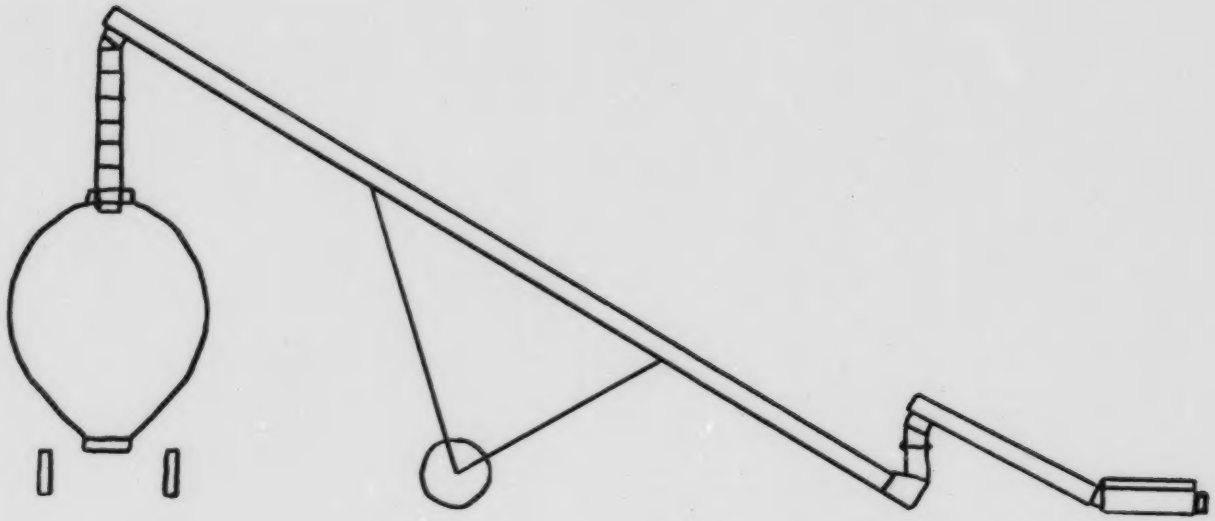


Figure 4.1: Permanent Auger Installation

Option #1 Material Specifications

Number Req'd.	Description of Equipment	Cost
one	10" x 41' portable grain auger with p.t.o.	$2,819
one	intake boot for above auger	122
three	44" auger downspout @ $46/each	138
one	10" x 12' feed auger	977
one	weather tarp for above auger	73
Total cost of Option #1		**$4,129**

Option #2: Self-contained Unit

Rather than develop a system from selected components a self-contained unit could be purchased. This option would be almost $800 more expensive than option #1. Again, this unit would require a tractor to power the auger. It would have a capacity of 3,800 bushels per hour or one hopper car per hour.

Option #2 Material Specifications

Number Req'd.	Description of Equipment	Cost
one	10" x 51' portable top feed grain auger with p.t.o.	$4,850
one	weather tarp for above auger	73
Total cost of Option #2		**$4,923**

B. Basic System With A Drive-over Dump Pit

This system would have augers with electric motor drive (e.m.d.). A winch would be used to position rail cars. It is suggested that the dump pit be raised to allow clean-out underneath and to facilitate general maintenance. This would require some wood planking and concrete. Backfill and gravel would be used on the inclines for the dump pit. If one chose to use concrete, the cost would escalate to between $8,000 and $10,000. This money would be better used in the purchase of storage facilities. Site preparation, electrical and general installation have not been included in these estimates. This basic system would have a capacity of 3,800 bushels per hour or one hopper car per hour. Figure 4.2 presents a conceptual layout of this facility.

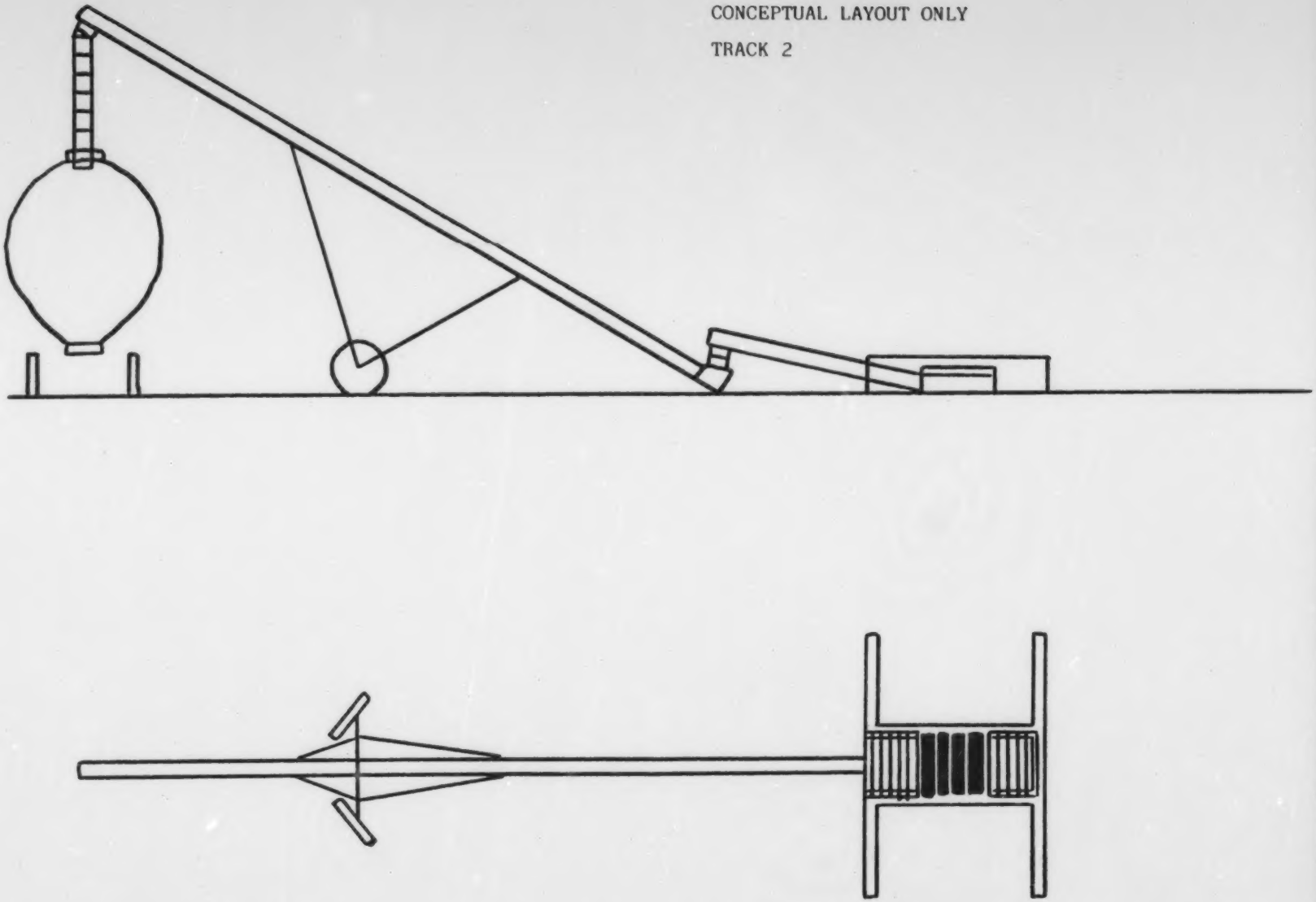


Figure 4.2: Basic System With A Drive-over Dump Pit

Basic System with Dump Pit Material Specifications

Number Req'd.	Description of Equipment	Cost
one	4 car pull winch with 5 hp. motor & foot switch	$8,500
one	10" x 41' portable grain auger with e.m.d.	2,819
one	intake boot for above auger	122
three	44" auger downspout @ $46/each	138
one	10 h.p. motor 3 phase for above auger	563
one	swivel arc kit	159
one	10" x 12' feed auger	997
one	weather tarp for above auger	73
one	5 h.p. motor for above auger	343
one	48" x 42" metal grate for truck dump pit	250
twelve	2" x 6" x 3'6" wood planks	1,000 (estimated)
2.5 cubic yards	concrete for dump pit	
sixteen	0.5" x 10' rebar	
	backfill	
	installation, electrical	5,000 (estimated)
Total cost		**$19,964**

C. Mini-elevator With Capacity of One Hopper Car/Hour

Augers Only

Figure 4.3 gives a conceptual layout of this facility. There are two options when selecting augers for the unloading of bins.

Option #1: Using Portable Auger

This option would use augers only to move the grain and would not have a housed dump pit. It would be similar in layout to Gary Nestibo's track loading facility. Again, this system would have a capacity of 3,800 bushels per hour or one hopper car per hour.

Option #2: Using Utility Auger

This option would use a utility auger rather than a portable auger for the bin unloading portion of the system. This option costs about $1,800 less but has the disadvantage that should the facility close, the utility auger is more difficult to sell as used equipment than the 61 foot portable auger identified under option #1.

Alternative Considerations

In discussions with producers and manufacturers two other options could be used. The first option would replace the augers and U-troughing for filling the bins with a portable auger similar to Figure 4.4. The cost of a portable auger would be approximately $3,200. Under option #1 it would replace $9,693 worth of equipment. Under option #2, it would replace $7,841 worth of equipment. The disadvantage of a portable auger is the requirement to move it to load bins. From a convenience point of view, producers may not wish to consider this alternative. The saving of using a portable auger would be approximately $500 per year in equipment depreciation and investment.

The second option would be to not install any augers or U-troughing and instead use a pneumatic system with a plastic cyclone to minimize grain damage. Figure 4.5 gives a schematic of a pneumatic system. The cost of a pneumatic system with electric motor With a capacity of about 3,800 bushels per hour would be

CONCEPTUAL LAYOUT ONLY

TRACK 3

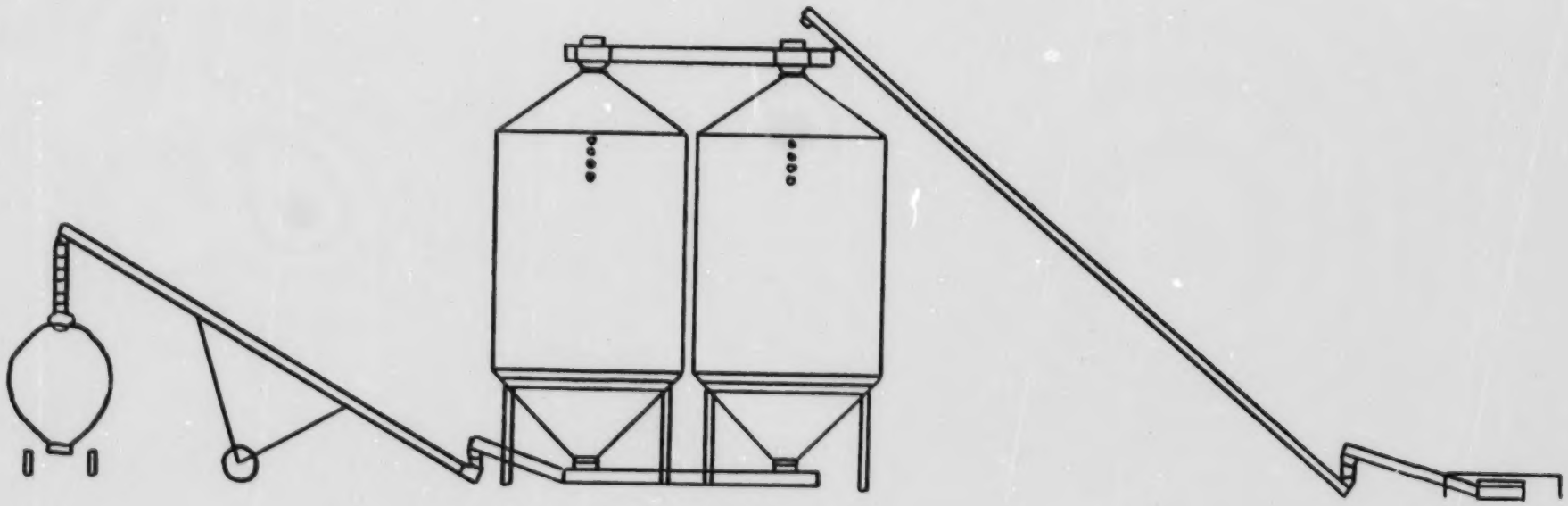
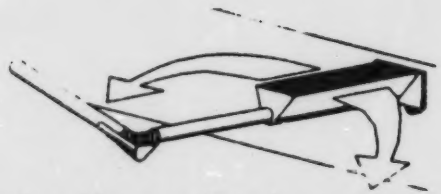
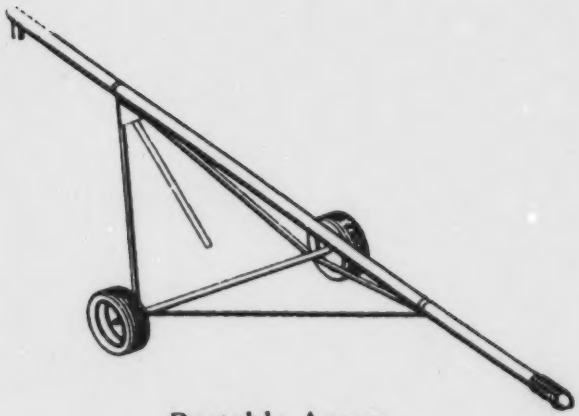


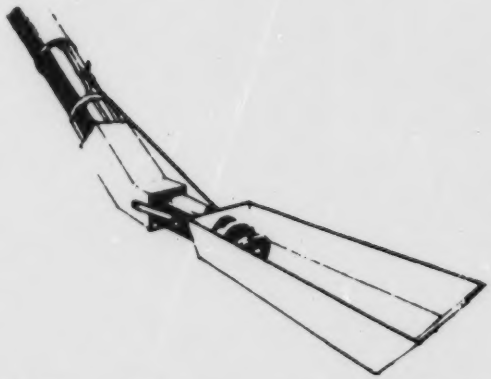
Figure 4.3: Mini-elevator With One Hopper Car/Hour Capacity Augers Only



Swinging Hopper Attachment for Auger



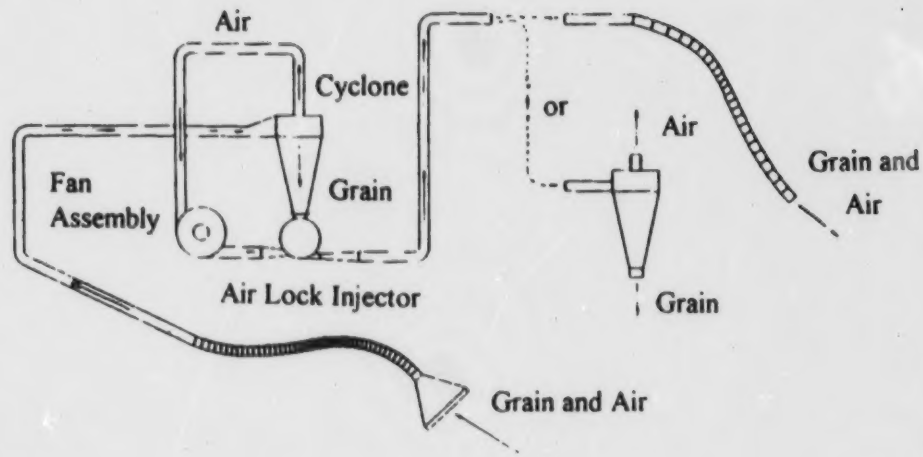
Portable Auger



Fold Down Hopper Attachment for Auger

ALTERNATIVE LOADING TECHNIQUE #1

Figure 4.4: Portable Auger



Portable Pneumatic System Principles

ALTERNATIVE LOADING TECHNIQUE #2

Figure 4.5: Pneumatic System

approximately $21,500. Larger units although available are extremely costly as they are more suited to port facilities. This would result in a "savings" of about $9,000 which would translate into $1,200 less in equipment depreciation and interest. However, the pneumatic system could not be easily linked to a bulkweighing system. This may be an option for the initial phases of development with the idea that later on the facility would have conveyors and a weigh scale. The pneumatic system could be used to supplement the later system to speed up loading of hopper cars.

Other Considerations

Similar to the basic system with a drive-over dump pit, the dump pit could be constructed totally out of concrete instead of using gravel and backfill. In this case, the cost would be $8,000 to $10,000.

Auger Only Option #1 Material Specifications

Number Req'd.	Description of Equipment	Cost
one	4 car pull winch with 5 hp. motor & foot switch	$8,500
one	10" x 41' portable grain auger with e.m.d.	2,819
one	intake boot for above auger	122
three	44" auger downspout @ $46/each	138
one	10 h.p. motor 3 phase for above auger	563
one	swivel arc kit	159
one	10" x 12' feed auger	997
one	weather tarp for above auger	73
one	5 h.p. motor for above auger	343
one	10" x 61' portable auger with e.m.d.	3,894
one	30 h.p. motor 3 phase for above augers	1,510
one	28' x 12" unload U-trough with incline	3,946
one	5 h.p. motor 3 phase for above conveyor	343
one	18' x 12" load U-trough with drops and controls	3,971
two	3,800 bushel hoppers with sight holes & epoxy lining @ $8,652/each	17,304
34 cubic yards	concrete for two bins (17 cu. yards per bin)	
96	0.5" x 16' rebar (48 pieces per bin)	
one	48" x 42" metal grate for truck dump pit	250
one	60 tonne platform truck scale (for legal trade)	24,200
one	housing for dump pit	12,000
twelve	2" x 6" x 3'6" wood planks	1,000 (estimated)
2.5 cubic yards	concrete for dump pit	
sixteen	0.5" x 10' rebar	
	backfill	
	installation, other concrete, electrical	15,000 (estimated)
	Total cost	**$97,132**

Auger Only Option #2 Material Specifications

Number Req'd.	Description of Equipment	Cost
one	4 car pull winch with 5 hp. motor & foot switch	$8,500
one	10" x 41' portable grain auger with e.m.d.	2,819
one	intake boot for above auger	122
three	44" auger downspout @ $46/each	138
one	10 h.p. motor 3 phase for above auger	563
one	swivel arc kit	159
one	10" x 12' feed auger	997
one	weather tarp for above auger	73
one	5 h.p. motor for above auger	343
one	10" x 61' utility auger with supports	2,042
one	30 h.p. motor 3 phase for above augers	1,510
one	28' x 12" unload U-trough with incline	3,946
one	5 h.p. motor 3 phase for above conveyor	343
one	18' x 12" load U-trough with drops and controls	3,971
two	3,800 bushel hoppers with sight holes & epoxy lining @ $8,652/each	17,304
34 cubic yards	concrete for two bins (17 cu. yards per bin)	
96	0.5" x 16' rebar (48 pieces per bin)	
one	48" x 42" metal grate for truck dump pit	250
one	60 tonne platform scale	24,200
one	housing for dump pit	12,000
twelve	2" x 6" x 3'6" wood planks	1,000 (estimated)
2.5 cubic yards	concrete for dump pit	
sixteen	0.5" x 10' rebar	
	backfill	
	installation, other concrete and electrical	15,000 (estimated)
	Total cost	**$95,280**

Bucket Elevator

Option #1: Using Augers

Figure 4.6 presents a conceptual layout of this facility. This structure would have a sixty-five foot bucket elevator to accommodate a bulkweighing system. If one used the low profile system being developed by one company, then only a fifty foot bucket elevator would be sufficient. This would save $2,800 by requiring only a fifty foot bucket elevator cost, $364 for a 10 hp. rather than 15 hp. motor, and a further $12,200 for a tower with service platform. Housing the dump pit is estimated to cost $12,000.

Option #2: Using Belt Conveyors

This facility would have a conceptual layout similar to Figure 4.6. The only difference would be that belt conveyors would be installed instead of augers.

To add a 4,000 bushel per hour screener (86" high x 21" wide by 43" long) would cost $8,500. This screener could be added to the system without increasing the height of the leg if it is installed in line with the rail car downspout. In this case, it would clean as grain is loaded into hopper cars. If one wanted to clean grain before storage, an additional fifteen feet would have to be added to the elevator leg at a cost of $4,000. In either situation, it is essential that the bucket elevator be supported by a tower. A service platform would be required to perform repairs and maintenance on the screener. This would cost an additional $1,200.

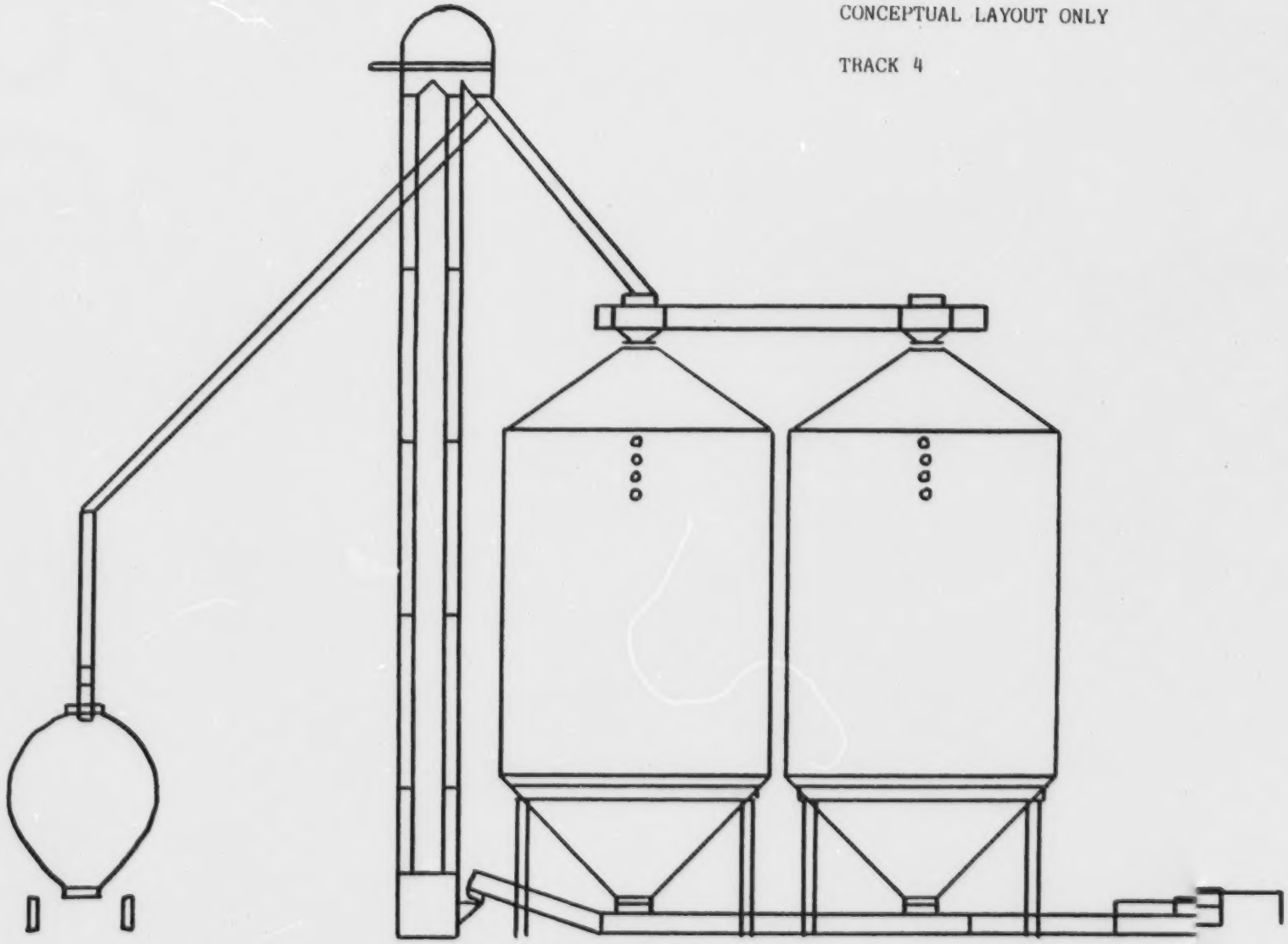


Figure 4.6: Mini-elevator With One Hopper Car/Hour Capacity Bucket Elevator

Bucket Elevator With Augers Material Specifications

Number Req'd.	Description of Equipment	Cost
one	4 car pull winch with 5 hp. motor & foot switch	$ 8,500
one	44' x 12" unload U-trough with incline	5,846
one	7.5 h.p. motor 3 phase for above conveyor	434
one	18' x 12" load U-trough with drops and controls	3,971
one	3 h.p. motor 3 phase for above conveyor	299
one	65' bucket elevator with two-way valve & spouts	25,680
one	15 h.p. motor 3 phase for above leg	1,027
one	weigh scale-auto drafting 15' H x 10' W x 10' L	50,000
one	structural support tower with platform for servicing scale	13,200
two	3,800 bushel hoppers with sight holes & epoxy lining @ $8,652/each	17,304
34 cubic yards	concrete for two bins (17 cu. yards per bin)	
96	0.5" x 16' rebar (48 pieces per bin)	
one	48" x 42" metal grate for truck dump pit	250
one	housing for dump pit	12,000
twelve	2" x 6" x 3'6" wood planks	1,000 (estimated)
2.5 cubic yards	concrete	
sixteen	0.5" x 10' rebar	
	backfill	
installation, other concrete and electrical		20,000 (estimated)
Total cost		**$159,511**

Bucket Elevator With Belt Conveyors Material Specifications

Number Req'd.	Description of Equipment	Cost
one	4 car pull winch with 5 hp. motor & foot switch	$ 8,500
one	45' unload belt with incline	37,800
one	5 hp. motor 3 phase for above conveyor	343
one	20' load belt with drops and controls	25,200
one	5 hp. motor 3 phase for above conveyor	343
one	65' bucket elevator with two-way valve & spouts	25,680
one	15 h.p. motor 3 phase for above leg	1,027
one	weigh scale-auto draft loading	50,000
one	structural support tower with platform for servicing scale	13,200
two	3,800 bushel hoppers with sight holes & epoxy lining @ $8,652/each	17,304
34 cubic yards	concrete for two bins (17 cu. yards per bin)	
96	0.5" x 16' rebar (48 pieces per bin)	
one	48" x 42" metal grate for truck dump pit	250
one	housing for dump pit	12,000
twelve	2" x 6" x 3'6" wood planks	1,000 (estimated)
2.5 cubic yards	concrete for dump pit	
sixteen	0.5" x 10' rebar	
	backfill	
	installation, other concrete and electrical	20,000 (estimated)
	Total cost	**$212,647**

D. Large-scale Mini-elevator With Grain Cleaning Capability

System With Capacity of Two Hopper Cars/Hour

This system would require a capacity equivalent to 8,000 bushels per hour. It is costed with a 100 tonne platform truck scale 10 feet by 85 feet at a cost of $59,100 (installed). Alternatively, one could install a 60 tonne platform truck scale with a platform 10 feet by 30 feet for a cost of $24,200 (installed).

System With Capacity of Three Hopper Cars/Hour

This is the only system with the capability of realizing incentive rates for multiple car loadings of 18 hopper cars or more within an eight hour period. With a cleaning system, it could provide all the basic services of a primary elevator.

Other Considerations

Again, if one so wished they could use concrete instead of gravel and backfill for the drive-over dump pit. The cost wouid be $8,000 to $10,000 compared to $1,000.

Two Hopper Car Per Hour System Material Specifications

Number Req'd.	Description of Equipment	Cost
one	4 car pull winch with 5 hp. motor & foot switch	$ 8,500
one	45' unload belt with incline	37,800
one	10 hp. motor 3 phase for above conveyor	563
one	20' load belt with drops and controls	25,200
one	5 hp. motor 3 phase for above conveyor	343
one	65' bucket elevator with two-way valve & spouts	34,500
one	25 h.p. motor 3 phase for above leg	1,308
one	screener 95" H x 31" W x 43" L	38,000
one	platform truck scale 100 tonne 10' x 85' platform	59,100
one	structural support tower with platform for servicing screener	13,200
four	25,000 bushel Westeel bins with floors and 10" unload augers and aeration fan @ $24,500/each	98,000
196 cubic yards	concrete for four bins (48 cu. yards per bins)	
	1800# rebar per bin	
one	120' belt conveyor with drops and control	87,000
one	25 hp. motor 3 phase for above conveyor	1,308
one	140' belt conveyor from storage to leg	65,400
one	30 hp. motor 3 phase for above conveyor	1,510
four	3,800 bushel hoppers with sight holes & epoxy lining @ $8,652/each	34,608
68 cubic yards	concrete for hopper bins (17 cu. yards per bin)	
192	0.5" x 16' rebar (48 pieces per bin)	
one	48" x 42" metal grate for truck dump pit	250
one	housing for dump pit	12,000
twelve	2" x 6" x 3'6" wood planks	1,000 (estimated)
2.5 cubic yards	concrete for dump pit	
sixteen	0.5" x 10' rebar	
	backfill	
	office	10,000
	installation, other concrete and electrical	30,000 (estimated)
	Total cost	**$559,590**

Three Hopper Car Per Hour System Material Specifications

Number Req'd.	Description of Equipment	Cost
one	4 car pull winch with 5 hp. motor & foot switch	$ 8,500
one	45' unload belt with incline	37,800
one	15 hp motor 3 phase for above conveyor	783
one	20' load belt with drops and controls	25,200
one	7.5 hp. motor 3 phase for above conveyor	434
one	65' bucket elevator with two-way valve & spouts	34,500
one	35 h.p. motor 3 phase for above leg	1,710
one	screener 100" H x 31" W x 53" L	38,000
one	platform truck scale 100 tonne 10' x 85' platform	59,100
one	structural support tower with platform for servicing screener	13,200
four	25,000 bushel Westeel bins with floors and 10" unload augers and aeration fan @ $24,500/each	98,000
196 cubic yards	concrete for four bins (48 cu. yards per bins)	
	1800# rebar per bin	
one	120' belt conveyor with drops and control	87,000
one	35 hp motor 3 phase for above conveyor	1,710
one	140' belt conveyor from storage to leg	65,400
one	40 hp motor 3 phase for above conveyor	1,910
four	3,800 bushel hoppers with sight holes & epoxy lining @ $8,652/each	34,608
68 cubic yards	concrete for hopper bins (17 cu. yards per bin)	
192	0.5" x 16' rebar (48 pieces per bin)	
one	48" x 42" metal grate for truck dump pit	250
one	housing for dump pit	12,000
twelve	2" x 6" x 3'6" wood planks	1,000 (estimated)
2.5 cubic yards	concrete for dump pit	
sixteen	0.5" x 10' rebar	
	backfill	
office		10,000
installation, other concrete and electrical		30,000 (estimated)
Total cost		**$561,105**

III. Costs Associated With Options

The fixed costs of each option shall be calculated based on the material specifications presented in Section II. The operating costs shall be based on the costs derived in Chapter 3 of this report.

A. Permanent Auger Installation

Option #1: Component Approach

Fixed Costs

- total machinery cost (excluding the tarp) is $4,056. Depreciation assuming 10 years and no salvage value would be equal to $406 annually. Investment cost at 6% interest would be $122 annually. The opportunity cost associated with the weather tarp is assumed to be at 6% interest or $4 per year. Total fixed costs associated with the machinery would be $532/year.

-other fixed costs would include site rental ($600), land taxes and business taxes ($1,000) and insurance ($7.50 per $1000 or $30). It is assumed these would total $1,630/year.

-total fixed costs would therefore be $2,162/year. Based on an annual volume of 50 hopper cars per year, this would be equal to approximately $43.24 per hopper car.

Operating Costs

-it is assumed that this operation would have operating costs of $36/car and handle 50 cars annually.

Total Cost

-the total cost of this facility assuming an annual movement of 50 hopper cars and excluding producer car fees would therefore be $79.24/car or $0.90/tonne (assuming 88 tonnes per car).

Option #2: Self-contained Unit

Fixed Costs

-total machinery cost (excluding the tarp) is $4,850. Depreciation assuming 10 years and no salvage value would be equal to $485 annually. Investment cost at 6% interest would be $146 annually. The opportunity cost associated with the weather tarp is assumed to be at 6% interest or $4 per year. Total fixed costs associated with the machinery would be $635/year.

-other fixed costs would include site rental ($600), land taxes and business taxes ($1,000) and insurance ($30). It is assumed these would total $1,630/year.

-total fixed costs would therefore be $2,265/year. Based on a movement of 50 hopper cars annually, this would be equivalent to $45.30/car.

Operating Costs

-operating costs are assumed to be $36/car similar to option #1.

Total Cost

-total cost would be $81.30/car or $0.92/tonne, excluding producer car fees.

B. Basic System With A Drive-over Dump Pit

System With Augers

Fixed Costs

-dump pit valued at $1,250 based on $250 for the metal grate and $1,000 for concrete, rebar, backfill and labour. Depreciation assumes 20 years and 10% salvage value or ($1,250-$125)/20 years for a figure of $56/year. Investment cost is based on 6% interest or {($1,250+$125)/2} x 6% for a figure of $41/year. Total fixed cost of the dump pit is $97/year.

-machinery (excluding the tarp) has a total value of $13,641. Depreciation assuming 10 years and no salvage value would be equal to $1,364 annually. Investment cost at 6% interest would be ($13,641)/2 x 6% = $409 annually. The opportunity cost associated with the weather tarp is assumed to be at 6% interest or $4 per year. Total fixed costs associated with the machinery would be $1,777/year.

-other fixed costs would include site rental ($600), land taxes and business taxes ($1,000) and insurance ($102). It is assumed these would total $1,702/year.

-assume installation, electrical and other concrete work costs $5,000. Then the opportunity cost would associated with this money would be $5,000 x 6% or $300/year.

-total fixed costs including opportunity cost of money used for installation would therefore be $3,876/year. Assuming that 150 hopper cars are loaded at this facility annually, the fixed cost per car would be $25.84/car.

Operating Costs

-assuming 150 hopper cars are filled annually the operating cost would be $63.05 plus 2% of the capital cost to cover repairs. The capital cost of this facility is $19,964. Repair costs would therefore be $399/ year or

$2.66/car. Total operating costs would be $65.71/car.

Total Cost

-total cost of this facility on a per hopper car basis would be $91.55/car or $1.04/tonne, excluding producer car fees. (Installation of a concrete dump pit would increase the cost to $97.43/car or $1.11/tonne.)

C. Mini-elevator With Capacity of One Hopper Car/Hour

Augers Only

Option #1: Using a Portable Auger

Fixed Costs

-dump pit valued at $13,250 based on $250 for the metal grate, $1,000 for concrete, rebar, backfill and labour and $12,000 to house it. Bins are valued at $17,304. Depreciation assumes 20 years and 10% salvage value or ($30,554-$3,055)/20 years for a figure of $1,375/year. Investment cost is based on 6% interest or {($30,554+$3,055)/2} x 6% for a figure of $1,008/year. Total fixed cost $2,383/year.

-machinery (excluding the tarp) has a total value of $51,505. Depreciation assuming 10 years and no salvage value would be equal to $5,151 annually. Investment cost at 6% interest would be $1,545 annually. The opportunity cost associated with the weather tarp is assumed to be at 6% interest or $4 per year. Total fixed costs associated with the machinery would be $6,700/year.

-other fixed costs would include site rental ($600), land taxes and business taxes ($1,000) and insurance ($728). It is assumed these would total $2,328/year.

-assume installation, other concrete for bins and electrical totals $15,000. Then the opportunity cost associated with this would be $900.

-total fixed costs would be $12,311 per year. Assuming 150 hopper cars are loaded from this facility annually, the fixed cost per car would be $82.07.

Operating Costs

-assuming 150 hopper cars are loaded per year, the operating costs of this facility would be $63.05/car plus 2% of capital costs to cover repairs. Capital costs totalled $97,132 for a repair cost of $1,943/year or $11.62/car. Total operating costs would therefore be $74.67/car.

Total Cost

-total cost per hopper car would be $156.74 or $1.78/tonne, excluding producer car fees. (Installation of a concrete dump pit would increase the cost to $163.95/car or $1.86/tonne.)

Option #2: Using a Utility Auger

Fixed Costs

-dump pit valued at $13,250 based on $250 for the metal grate, $1,000 for concrete, rebar, backfill and labour and $12,000 for housing. Bins are valued at $17,304. Depreciation assumes 20 years and 10% salvage value or ($30,554-$3,055)/20 years for a figure of $1,375 year. Investment cost is based on 6% interest or {($30,554+$3,055)/2} x 6% for a figure of $1,008/year. Total fixed cost $2,383/year.

-machinery (excluding the tarp) has a total value of $49,653. Depreciation assuming 10 years and no salvage value would be equal to $4,965 annually. Investment cost at 6% interest would be $1,490 annually. The opportunity cost associated with the weather tarp is assumed to be at 6% interest or $4 per year. Total fixed costs associated with the machinery would be $6,459/year.

-other fixed costs would include site rental ($600), land taxes and business taxes ($1,000) and insurance ($715). It is assumed these would total $2,315/year.

-assume installation, other concrete for bins and electrical totals $15,000.

Then the opportunity cost associated with this would be $900.

-total fixed costs would be $12,057 per year. Based on 150 hopper cars per year, this would equate to $80.38/car.

Operating Costs

-operating costs would be $63.05/car plus 2% of capital cost for repairs. The repair costs would equal $1906 or $12.71/car. Total operating costs would therefore be $75.76/car.

Total Cost

-total cost of this facility would be $156.14/car or $1.77/tonne, excluding producer car fees. (Installation of a concrete dump pit would increase the cost to $162.02/car or $1.84/tonne.)

Bucket Elevator

Option #1: Using Augers With Bucket Elevator

Fixed Costs

-dump pit valued at $13,250 based on $250 for the metal grate, $1,000 for concrete, rebar, backfill and labour and $12,000 for the building. Bins are valued at $17,304 and the elevator tower at $13,200. Depreciation assumes 20 years and 10% salvage value or ($43,754-$4,375)/20 years for a figure of $1,969/year. Investment cost is based on 6% interest or {($43,754+$4,375)/2} x 6% for a figure of $1,444/year. Total fixed cost $3,413/year.

-machinery has a total value of $95,757. Depreciation assuming 10 years and no salvage value would be equal to $9,576 annually. Investment cost at 6% interest would be $2,873 annually. Total fixed costs associated with the machinery would be $12,449/year.

-other fixed costs would include site rental ($600), land taxes and business taxes ($1,000) and insurance ($1,196). It is assumed these would total $2,796/year.

-assume installation, other concrete for bins and electrical totals $20,000. Then the opportunity cost associated with this would be $1,200.

-total fixed costs would be $19,858 annually. Based on 150 hopper cars per year, the fixed cost would be $132.39/car.

Operating Costs

-based on 150 hopper cars per year, the operating costs would be $63.05 per car plus repair costs. Repair costs would be $3,190/year or $21.27/car. Total operating costs would therefore be $84.32/car.

Total Cost

-total cost on a per hopper car basis would be $216.71 or $2.46/tonne, excluding producer car fee. (Installation of a concrete dump pit would increase the cost to $222.59/car or $2.53/tonne.)

Option #2: Using Belt Conveyors With Bucket Elevator

Fixed Costs

-dump pit valued at $13,250 based on $250 for the metal grate, $1,000 for concrete, rebar, backfill and labour and $12,000 for the building. Bins are valued at $17,304 and the elevator tower at $13,200. Depreciation assumes 20 years and 10% salvage value or ($43,754-$4,375)/20 years for a figure of $1,969/year. Investment cost is based on 6% interest or {($43,754+$4,375)/2} x 6% for a figure of $1,444/year. Total fixed cost $3,413/year.

-machinery has a total value of $148,893. Depreciation assuming 10 years and no salvage value would be equal to $14,889 annually. Investment cost at 6% interest would be $4,467 annually. Total fixed costs associated with

the machinery would be $19,356/year.

-other fixed costs would include site rental ($600), land taxes and business taxes ($1,000) and insurance ($1,595). It is assumed these would total $3,195/year.

-assume installation, other concrete for bins and electrical totals $20,000. Then the opportunity cost associated with this would be $1,200.

-total fixed costs would be $27,164 annually. Based on 150 hopper cars per year, the fixed cost would be $181.09/car.

Operating Costs

-based on 150 hopper cars per year, the operating costs would be $50.60 per car plus repair costs. Repair costs would be $4,253/year or $28.35/car. Total operating costs would therefore be $78.95/car.

Total Cost

-total cost on a per hopper car basis would be $260.04 or $2.96/tonne, excluding producer car fee. (Installation of a concrete dump pit would increase the cost to $265.92/car or $3.02/tonne.)

D. Large-scale Mini-elevator With Grain Cleaning Capacity

Option #1: Two Hopper Car Per Hour Capability

Fixed Costs

-dump pit valued at $13,250 based on $250 for the metal grate, $1,000 for concrete, rebar, backfill and labour and $12,000 for the building. Bins are valued at $132,608 and the elevator tower at $13,200. The office is valued at $10,000. Depreciation assumes 20 years and 10% salvage value or ($169,058-$16,906)/20 years for a figure of $7,608/year. Investment cost is based on 6% interest or {($169,058-$16,906)/2} x 6% for a figure of $5,579/year. Total fixed cost $13,187/year.

-machinery has a total value of $360,532. Depreciation assuming 10 years and no salvage value would be equal to $36,053 annually. Investment cost at 6% interest would be $10,816 annually. Total fixed costs associated with the machinery would be $46,869/year.

-other fixed costs would include site rental ($600), land taxes and business taxes ($1,000) and insurance ($4,197). It is assumed these would total $5,797/year.

-assume installation, other concrete for bins and electrical totals $30,000. Then the opportunity cost associated with this would be $1,800.

-total fixed costs would be $67,653 annually. Based on 300 hopper cars per year, the fixed cost would be $225.51/car.

Operating Costs

-based on 300 hopper cars per year, the operating costs would be $34.97 per car plus repair costs. Repair costs would be $11,192/year or $37.31/car. Total operating costs would therefore be $72.28/car.

Total Cost

-total cost on a per hopper car basis would be $297.79 or $3.38/tonne, excluding producer car fee. (Installation of a concrete dump pit would increase the cost to $300.73/car or $3.42/tonne.)

Option #2: Three Hopper Car Per Hour Capability

Fixed Costs

-dump pit valued at $13,250 based on $250 for the metal grate, $1,000 for concrete, rebar, backfill and labour and $12,000 for the building. Bins are valued at $132,608 and the elevator tower at $13,200. The office is valued at $10,000. Depreciation assumes 20 years and 10% salvage value or ($169,058-$16,906)/20 years for a figure of $7,608/year. Investment cost is based on 6% interest or {($169,058-$16,906)/2} x 6% for a figure of $5,579/year. Total fixed cost $13,187/year.

-machinery has a total value of $360,532. Depreciation assuming 10 years and no salvage value would be equal to $36,053 annually. Investment cost at 6% interest would be $10,816 annually. Total fixed costs associated with the machinery would be $46,869/year.

-other fixed costs would include site rental ($600), land taxes and business taxes ($1,000) and insurance ($4,208). It is assumed these would total $5,808/year.

-assume installation, other concrete for bins and electrical totals $30,000. Then the opportunity cost associated with this would be $1,800.

-total fixed costs would be $67,664 annually. Based on 450 hopper cars per year, the fixed cost would be $150.36/car. For a 1,000 hopper car per year capacity, the total fixed costs would be $67.66/car. For a high volume (2,500 cars per year), the total fixed costs would be $27.07/car. (Installation of a concrete dump pit would increase these costs to

$151.92/car for 450 cars annually, $68.37/car for 1,000 cars annually and $27.37/car for 2,500 cars annually.)

Operating Costs

-based on 450 hopper cars per year, the operating costs would be $29.04 per car plus repair costs. Repair costs would be $11,222/year or $24.94/car. Total operating costs would therefore be $53.98/car. For a 1,000 car per year facility, the operating costs would be $40.26/car and, for a 2,500 car per year facility, the operating costs would be $33.53/car. (Installation of a concrete dump pit would increase these costs by $180 per year.)

Total Cost

-total cost on a per hopper car basis for a 450 car per year facility would be $204.34/car or $2.32/tonne, excluding producer car fee. For a 1,000 car facility, it would be $107.92/car or $1.23/tonne. For a 2,500 car facility, it would be $60.60/car or $0.69/tonne. (Installation of a concrete dump pit would increase these costs to $206.29/car or $2.34/tonne for a 450 car facility, $108.10/car or $1.23/tonne for 1,000 cars and $60.97/car or $0.69/tonne for 2,500 cars.)

E. Summary of Costs

Table 4.1 summarizes the costs associated with each alternative grain handling system based on a dump pit with backfill and gravel. The last two options -- mini-elevator with two hopper car capacity and mini-elevator with three hopper car capacity--would have income from the cleaning of grain. Currently under the CGC maximum tariffs for 1994/95, the primary elevators can charge up to $3.11/tonne for wheat to clean it and not return the screenings to the producer. If the screenings were returned to the producer, the fee could be up to $13.86/tonne (see Appendix IV for the rates). If the track loading site assessed a fee of $2.00/tonne for cleaning, the producer would "save" approximately

Table 4.1: Summary of Costs for Demonstration Track Loading Systems											
	1	2	3	4	5	6	7	8	9 (low)	9 (med)	9 (high)
	dollars										
Fixed Costs	2,162	2,265	3,876	12,311	12,057	19,858	27,164	67,653	67,664	67,664	67,664
Operating Costs	1,800	1,800	9,857	11,201	11,364	12,648	11,843	21,684	24,291	40,260	83,825
Total Cost	3,962	4,065	13,733	23,512	23,421	32,506	39,007	89,337	91,955	107,924	151,489
	dollars per hopper car										
Fixed Costs	43 24	45 30	25 84	82 07	80 38	132 39	181 09	225 51	150 36	67 66	27 07
Operating Costs	36 00	36 00	65 71	74 67	75 76	84 32	78 95	72 28	53 98	40 26	33 53
Total Cost	79 24	81 30	91 55	156 74	156 14	216 71	260 04	297 79	204 34	107 92	60 60
Total Cost-Self Administer	129 24	131 30	141 55	206 74	206 14	266 71	310 04	347 79	254 34	157 92	110 60
Total Cost-Co. Administer	254 24	256 30	266 55	331 74	331 14	391 71	435 04	472 79	379 34	282 92	235 60
	cost per tonne										
Cost/tonne-Self Administer	1 47	1 49	1 61	2 35	2 34	3 03	3 52	3 95	2 89 1 14*	1 79 0 04*	1 26 (0 49)*
Cost/tonne-Co. Administer	2 89	2 91	3 03	3 77	3 76	4 45	4 94	5 37	4 31 2 56*	3 22 1 47*	2 68 0 93*

*rate if receive incentive of $1 75 for multiple car spot of 20 cars or more

1-Permanent Auger Component Approach
2-Permanent Auger Self-contained Unit
3-Basic System Drive-over Dump Pit
4-Mini-elevator Portable Auger
5-Mini-elevator Utility Auger
6-Mini-elevator Bucket Elevator Augers
7-Mini-elevator Bucket Elevator with Belts
8-Mini-elevator 2 cars/hr
9-Mini-elevator 3 cars/hr

$1.00/tonne compared to the primary elevator and the track loading site would have even lower costs per tonne. The three hopper capacity operation also has the capability to capitalize on incentive rates for multiple car spots. It should be noted that the capital costs associated with the two hopper car per hour facility are almost identical to the costs for the three hopper car per hour facility. This is because the difference between the two is basically the sizes of motors required to drive the belts and other equipment. It therefore makes sense to invest the few extra dollars in the larger facility, especially if the number of car spots is sufficient for this capacity.

Table 4.2 presents the break-even analysis for the various systems at fees from $1.25 to $3.00/tonne. This is done to facilitate comparisons with the actual producer sites identified in Chapter 3. The final grain handling system (number 9) also considers the break-even number of cars required if the incentive rate for a twenty car spot was realized. The incentive rates dramatically reduce the number of cars the facility must handle.

Based on total costs and considering potential income from grain cleaning and discounted freight rates due to spotting 18 or more hopper cars, the mini-elevator track loading system which has the capability of loading three hopper cars per hour is the most economical.

Table 4.2: Break-even Analysis on Demonstration Track Loading Sites, Number of Hopper Cars Required

	Fee Charged Per Tonne				
Site No.	**$1.25**	**$1.50**	**$1.75**	**$2.00**	**$3.00**
1	36	30	26	23	15
2	37	31	27	23	16
3	125	104	89	78	52
4	214	178	153	134	89
5	213	178	152	133	89
6	296	247	211	185	123
7	355	296	254	222	148
8	812	677	580	508	339
9	836 349*	697 322*	597 299*	523 279*	349 220*

*number of cars required if incentive rate of $1.75 for 20 car spot.

1-Permanent Auger Component Approach
2-Permanent Auger Self-contained Unit
3-Basic System Drive-over Dump Pit
4-Mini-elevator Portable Auger
5-Mini-elevator Utility Auger
6-Mini-elevator Bucket Elevator & Augers
7-Mini-elevator Bucket Elevator & Belt Conveyors
8-Mini-elevator Two Hopper Cars/Hour
9-Mini-elevator Three Hopper Cars/Hour

Chapter 5

Infrastructure, Marketing and Regulatory Issues

I. Infrastructure Issues

Loading Site Specifications

The railway prefers to have a slight "bowl" slope to the track to ensure safety in the event that loaded cars become loose and roll freely. The track therefore may have a slight slope of about 0.15% in the middle section but rise at each end at a slope of not more than 1%. This "bowl" effectively prevents the use of gravity to position hopper cars at the track loading site. Operators of loading sites recommend the use of a car puller. Costs range from $5,800 to $7,000 depending on the size of the motor.

Rail cars have a load capacity of 200,000 lbs. and carry 3,800 bushels of wheat. The coupled length of a hopper is 59 feet 3 inches with a height above the rail of 14 feet 8 inches and a width of 10 feet 7 inches. The hatch opening is continuous running 47 feet 6 inches. The railways and Transport Canada have worked together to develop standard railway clearances for elevator sites to accommodate these hopper cars. When designing a track loading system, the construction company should contact the railway to determine the most current standards.

Hopper cars must be loaded to within 1% of the rated car capacity unless the specific gravity of a commodity is such that the car is full on a volume basis before the rated weight capacity is reached. The use of a scale to measure the weight of the grain being loaded ensures these guidelines are met and provides verification of the amount of grain loaded in the event of a spill or leakage.

When selecting a loading site, one should consider the existing number of car spots but also, the potential to expand the number of spots and the loading

facility itself. Generally, operators commented that they would prefer more spots and when asked suggested a ten car spot should be the minimum size. Based on the incentive rates offered by the railways and the fact that primary elevators will reduce their elevation charges at sites to keep cliental, it is recommended that an eighteen car spot with potential for additional "public access" trackage or a spur line be selected.

With deregulation, the railways will insist on loading being completed in an eight hour period. This situation will be reinforced by the grain industry adopting a just-in-time delivery system. To facilitate prompt loading of all hopper cars within this timeframe, the storage volume and equipment capacity must be capable of loading all the car spots at the site. For example, if the site has an eighteen car spot, then the storage capacity required would be 68,400 bushels and the equipment capacity necessary would be 9,500 bushels/hour (assuming only 90% efficiency and basing the calculation on 3,800 bushels/car). The use of large bins may necessitate a larger storage capacity because of grain and grade segregation. For primary elevators, it is assumed that only 80% of the storage capacity can be effectively used. This problem can be overcome by using smaller (3,800 to 4,000 bushel) hopper bins as one bin would fill one hopper car.

The issue of whether to lease the site or purchase the property may be irrelevant if the railway is unwilling to consider the sale of the site. Some operators have been fortunate to be able to purchase the property for a small fee (eg. Hugh Campbell paid $3,500). Other producers have found that either the railway is unwilling to sell the site or the price is equivalent to the current rental rate applied for up to fifteen years (eg. Gary Nestibo pays $700/year in rent but may be able to purchase the site for $10,000). In this case, one has to determine how long the facility is expected to be located at the site. Changes in the WGTA, shifts in grain production, branchline abandonment and quality of rail service may result in relocation of the track loading facility in the future. Unless the site has a minimum of an eighteen car spot and a certainty to remain in the rail network, it would be advisable to lease the track loading site.

Producers who do rent sites have deliberately designed their facilities so they can be moved. Concrete dump pits should be avoided at rented locations as they are relatively costly and not transportable. Use of raised dump pits with conveyors underneath or augers with swinging hoppers can address this concern.

Receiving Site Specifications

Producer track loading facilities should be located outside of town centres to avoid high property and business taxes, to facilitate future expansion and to accommodate deliveries by all sizes of trucks including semi-trailers. The average truck delivering grain to the facility will have a GVW of 30,000 lbs. and a capacity of 300 bushels. Other trucks at the site will probably have a GVW of 74,000 lbs., a load of 60,000 lbs. or 1,000 bushels of wheat and a minimum axle spacing of 57 feet. B trains are even larger with a carrying capacity of 2,000 bushels.

Producer loading sites located near several major highways will have the potential to draw grains from a larger catchment area. The access road to the facility must be capable handling large semi-trailers. Trucks should drive forward through the unloading area. The entry road for trucks must be sufficient to accommodate a number of trucks of the largest size (normally primary elevators are designed for five trucks but, equipment capacity of the track loading site may be a factor to consider) and have a size adequate to accommodate the turning radius of trucks. Ideally, the site design should keep the truck turning to a minimum. A simple angle off the main road into the raised, dump pit area and gradual angle back onto the municipal or provincial road would be the optimum. The site should be level and have sufficient quality of packed gravel to ensure access by vehicles even in inclement weather.

To speed up the receiving of grain, a facility which services a large number of producers may consider the installation of the credit card system to electronically record the producer's information. This should only be considered if the number of producers, volume of crops handled and seasonal activity warrants the $10,000 expenditure.

All equipment must be interlocked such that units must be started in an "upstream" sequence. Industry sources advise they like to have at least a 10% higher capability for each sequential piece of equipment. For example, auger #1 would have a capability of handling 3,000 bushels/hour. Auger #1 feeds auger #2. Auger #2 has a capacity of at least 3,300 bushels/hour. For safety reasons, the operator must be able to stop all equipment in the event of an emergency, or failure of a piece of equipment.

Utilities

Based on the Grains Group document *"Transportation & Handling Section Country Elevator Study"*, March, 1971, the total initial power supplied should be 150% of the calculated initial load. The site designer should calculate the required power based on the facility's current and anticipated future handling capacities. Yard lighting is also important to include in these calculations. In general, producer track loading sites use less power than the minimum charge assessed by the hydro utility.

Water should be supplied to the site at a pressure of 80 psi. Sewers must comply with sanitation and pollution control legislation. For a site which can use a town's infrastructure, this will not be a major problem. For a site which cannot utilize the town's services, these locations will need either a well or transported water, and septic field or holding tank. A well and holding tank could add at least $5,000 to the cost of the facility.

Telephone will be essential to the general office. Computer hook-up to a commodity news service may also be desirable, if one wants current pricing information or to use this service to attract clients.

II. Marketing Issues

Over the last ten years, there have been significant changes in crop production across the prairies. These changes can be summarized as follows:

(a) canola production has increased substantially. In 1993, canola production was 5.3 million tonnes compared to the ten year average of 3.5 million tonnes. Preliminary statistics for 1994 indicate that western Canada produced 7.4 million tonnes of canola. For Saskatchewan, 2.3 million tonnes of canola were produced in 1993 compared to the ten-year average (1983-1992) of 1.4 million tonnes. Preliminary data for 1994 suggests production levels of 3.1 million tonnes.

(b) significant increases have occurred in the production of specialty crops (mustard seed, sunflower seed, canary seed, lentils and peas). Mustard seed production in Saskatchewan was 310 000 tonnes in 1994 and 180 000 tonnes in 1993 compared to the ten-year average of 110 600 tonnes. Pea production was forecast to be 850 000 tonnes in 1994, eight times the ten-year average. Lentil production in Saskatchewan showed a similar pattern with 1994 production at 375 000 tonnes compared to the ten-year average of 132 600 tonnes.

Market outlook information suggests over the near term that canola production on the prairies will decrease because of strengthening wheat prices, disease problems with the canola and its associated higher yield risk. Analysts are forecasting a one million tonne decline in canola production in 1995 with production relatively stable thereafter. Specialty crops will continue to see innovation and growth. Pea acreage alone is expected to increase up to one million acres over the next five years. Wheat production is expected to increase modestly each year for the next five years.

These shifts in crop production highlight the need for flexibility in tomorrow's

grain handling and transportation system. A producer track loading facility must be capable of handling a variety of crops and grades. When determining one's storage and handling requirements for a track loading facility, consider the crops grown in the surrounding area and anticipated production trends. Specialty crops are usually shipped in smaller lots than wheat or barley. This has implications for the size of the storage facilities selected. Many existing track loading sites have purchased 3,800 to 4,000 bushel hopper bins as they can be used to store any crop. They also hold the equivalent of one hopper car of grain, thereby ensuring the integrity of the grain. Large storage bins potentially could limit one's ability to adapt to changing production patterns. If operating as an primary elevator or a grain dealer, regulations require segregation of differing grades of grain. To effectively use a large bin, one must either have several producers delivering an identical quality and type of product, or specifically assign a bin to an individual producer. As mentioned earlier, a primary elevator is expect to use only 80% of storage capacity because of the number of grades and types of grain. By minimizing the number of large storage facilities, a track loading site can reduce or eliminate unused storage capacity, respond to changing production patterns and service smaller, niche markets with specialty crops.

Specialty crops for human consumption require care in handling. Peas for human consumption can be quickly downgraded to feed peas if the handling system splits the product by using augers or dropping it substantial heights into the bin. Augers and chain conveyors are not conducive to the handling of food grade specialty crops. Belt conveyors and pneumatic systems with plastic cyclones can minimize grain damage. If one anticipates only handling feed quality specialty crops, then augers or chain conveyors with lower capital costs can be used.

One comment expressed by some industry representatives interviewed was the important role the existing primary elevator system plays in blending various qualities of grain. To date, no track loading facility performs this function. The reason for this can be explained by the fact that to blend grain one would be require to pay the producer based on the grade of grain he delivers to the site.

One would therefore have to grade, determine dockage and test for moisture each load of grain. Existing sites do not perform this function as they would require a license from the CGC. The cost of satisfying the regulatory requirements (bonding) would not make this viable if the potential volume of crops to be blended is limited. Most track loading facilities are not licensed as they provide a custom loading service rather than purchase the producer's grain.

III. Value-added Opportunities

Cleaning Grain

With the producer facing the full WGTA freight rate, it will become more feasible to clean grain on the prairies. The question is should track loading sites clean grain to the 1% dockage level or should they clean to export standards (3/4 of 1%)? Although cleaning grain has its positive income features in terms of lower freight costs and the sale of screenings, it should also be mentioned that repair and maintenance costs are high for cleaning units compared to augers and conveyors. Cost of the equipment will be a major factor in deciding what level of dockage to clean to. Export quality cleaners sell for about $70,000 while dockage cleaners sell for about half this price. Producer operators suggest that the 1% level is the most economic for a track loading site.

Besides reducing the freight bill, cleaning can provide an important source of revenue. An operator could "return" to the producer his screenings and charge a slightly higher fee per tonne for using the facility, or he could charge a lower fee and sell the screenings to a local feed mill or livestock operation. If the facility is licensed as a primary, the CGC sets the maximum tariff one can charge if the screenings are returned to the producer or if they are sold. If the facility is licensed as a grain dealer, the maximum tariffs must be filed annually with the CGC and posted in the office at the site.

Bagging Specialty Crops

This is a very labour intensive activity and would necessitate the purchase of a warehouse to store bagged specialty crops and a small tractor to move product to the track site. However, it would effectively use the lack periods when the site is not busy and could result in further value-added opportunities. To be successful in this venture, the operator would have to develop contacts with exporters or seek out markets on his own.

Condo Storage

Several grain companies are currently experimenting with producer-owned "segregated" storage beside primary elevators. Under this system each producer owns a part of the storage bin (eg. Joe Brown owns the first two feet of space, John Smith owns the area from the second foot to the fourth foot, etc.). Each producer has a land title for his physical space. Bins of this nature would have to store "like" grain. This provides the producer with the ability to move his crop after harvest to the storage and "deliver" his grain when he so chooses (in effect he does not deliver it, the elevator simply processes the paper and declares it to be in the elevator).

There is no reason to exclude condo storage from a track loading site. Producers could purchase bin storage space at the facility. This would eliminate problems in ensuring timely delivery. To avoid CGC licensing problems, it is recommended that the bins be assigned to one producer only. The producer would therefore select a bin size most appropriate for his operation. As many bin manufacturers have leasing arrangements, producers and/or operators of sites may wish to follow up with them to determine costs and level of interest.

III. Regulatory Issues

Licensing Requirements

Under the Canada Grains Act, no elevator can handle grain unless it is licensed. There are several types of licenses. They are:

(a) primary elevator license covers a facility, the principal use of which is to receive grain directly from producers for storage or forwarding.

(b) terminal elevator license is issued to an elevator, the principal use of which is to receive grain upon or after official inspection and official weighing of the grain, and to clean, store and treat the grain before it is moved forward.

(c) transfer elevator license is issued to an elevator in the Western or Eastern Division, the principle use of which is to transfer grain that has been officially inspected and weighed at another elevator, and an elevator in the Eastern Division that receives, cleans and stores eastern or foreign grain.

(d) process elevator license is issued to an elevator, the principal use of which is to receive or store grain for direct manufacture or processing into other products.

and (e) grain dealer license is required of a person who for reward, on his own behalf or on the behalf of another person, deals in or handles western grain.

Track loading sites should focus on the issue of the type, if any, license they would require to operate. Three options are (a) no license, (b) a grain dealer license or (c) a primary elevator license.

Track loading facilities which do not market the grain or purchase it but simply custom load producers car *do not require a license* from the CGC. This is the most common situation today. A person who enters into a contract for the purchase of grain without reference to any grade and pays the amount in full at the time of making the contract or delivery is not required to be licensed. A facility could therefore function using this provision of the Act.

If the facility will purchase non-Board grains, a *grain dealer license* is required. To obtain a grain dealer's license, an application must be made to the CGC. A license fee of $1,200 must accompany the application. The applicant must satisfy the CGC that he is capable of operating the facility and must post a bond to ensure the payment of money owing producers. A grain dealer will issue cash purchase tickets (evidence of the purchase of the grain) or grain receipts (acknowledging receipt of the grain and entitlement of the holder to payment). A dealer submits monthly a report of outstanding liabilities to producers, and a second report identifying purchases and destinations of shipments. The CGC uses the first report to monitor the amount of the bond posted to ensure sufficient protection for producers who hold cash purchase tickets or grain receipts.

A grain dealer is not allowed to have any interest directly or indirectly beyond his agreed commission in the purchase or sale of the grain. The CGC sets maximum fees for services.

If the facility will weigh, elevate and store grain and discharge it to railway cars, a *primary elevator license* is required. In addition, to act as a purchasing agent for the CWB, one also requires an elevator license. An application for a license to operate as a primary elevator must be made to the CGC. The application fee is $60 per year. Facilities with elevator licenses must have more than one bin. To be bonded as an elevator, the owner must submit articles of incorporation, bank statements and issue cash purchase tickets (evidence of purchase of the grain by the operator of the elevator) and elevator receipts (evidence of receipt of grain). Bonding protects the producer delivering his grain to a primary elevator and sets forth regulations under which all sampling, grading, weighing,

storing and shipping of grain will be conducted.

The CGC must be satisfied that the type, size and condition of the primary elevator and its associated equipment can provide the services required under the Canada Grain Act (ie efficient and accurate weighing, sampling, inspection, and accommodation of all grain, grain products and screenings--the facility need not have the capability to clean or dry grain). Similar to the grain dealer licence, the primary elevator must be financially able to meet his obligations. The CGC will determine the amount of bond required based on anticipated volumes. The elevator will submit on a weekly basis (a) a report of the value of the grain stocks in storage, and (b) a report of all shipments and deliveries for the previous week. The CGC monitors the value of stocks report to ensure the facility has an adequate size of bond. In addition, annual reports must be filed no later than mid-October in each crop year.

The licensee is also required to keep all grain fully insured against fire and explosion. The insurance policy must specify that the proceeds of the policy are payable to the holders of elevator receipts for grain stored in the facility.

Primary elevators must be open reasonable hours and provide without discrimination services in the order in which the grain arrives. The cash purchase ticket must state the grade of the grain and the dockage, except for grain for special binning. Special binning applies to grain stored for a contract which must have its identity preserved. Grain for special binning is issued an interim elevator receipt. The grade of the grain is determined by the CGC. Not more than 30% of the elevator capacity can be used for special binning.

A producer can request that his grain be cleaned at the primary elevator, if the facilities exist. Upon delivery of his grain, he is issued a special bin primary elevator receipt. After the grain is cleaned, this interim receipt is surrendered and a new receipt issued with the grade and quantity after cleaning identified. Where the grain was delivered for cleaning only, the elevator shall issue a cleaning receipt.

The CGC sets the maximum charges for services. The license to operate, schedule of charges and other information must be posted in the office area for the general public to view. If a licensed elevator wants to provide a service for which there is no maximum charge, the elevator must apply to the CGC to set a maximum charge.

In addition to the CGC licensing requirements, an applicant for a primary elevator license must satisfy the conditions of the CWB. To handle CWB crops, the CWB requires that the applicant meet the following requirements:

1. the company has the facilities to conduct the type of business for which it is licensed (ie. it can weigh, elevate and store grain).

2. the company must have an office or agent in Winnipeg.

3. the financial statements must be submitted and the Board satisfied of the financial condition of the company. The company should have adequate permanent capital to meet any claims.

4. the CWB can do any or all of the following:
   (a) require a bank reference,
   (b) request a letter of credit or bond,
   (c) use a rating agency to assess the company;
   (d) obtain from the CGC assurances that any bonds will cover potential liabilities.

If granted a CWB handling agreement, the company must develop an electronic system for reporting to the Board within the first year. The first year of a handling agreement is viewed as a probationary period. Failure to meet all the requirements of the agreement results in cancellation. Appendix III provides the detail of the Memorandum of Agreement for a Primary Elevator. The appendix also includes the CWB guidelines on condominium storage at primary elevators.

For either the *primary elevator or grain dealers*, CGC staff have the right to examine the premises, books, records, bills of lading or other documents at any time. Records must be kept for a period of six years. The CGC also investigates complaints and arbitrates disputes (eg. grading or weighing). Under the general terms of every license, the CGC must be notified of any functional alteration or damage to the facility.

Weighing Requirements

In addition to satisfying the CGC that the weighing of grain is efficient and accurate, Weights and Measures Canada must inspect the scale facilities after installation and re-test them at least every five years thereafter. Weights and Measures will not verify axle scales because they are not for legal tender. Although they will verify belt weighing equipment, the accuracy of this equipment will vary daily due to belt wear, belt tracking, and general weather conditions. It is unlikely that the CGC would consider belt weighing equipment "accurate". For this reason, load sensing bulkweighers are the preferred choice.

Rail Car Allocations

Producer Allocations

Producers are entitled to have rail cars for the movement of their grains. In all cases, producers must send an application to the CGC along with a $20 non-refundable application fee per car. The allocation of cars to producers is based on the following:

- For CWB grains, there is no limit on the number of producer cars allocated per train run. However, the CWB will allocate the cars based on the grain and grade pattern on that train run. Producers must have sufficient quota/contract call to deliver.
- For non-Board grains (wheat, barley and oats), the allocation will be based on 10% of the weekly movement to terminals in the order the applications were received. In a backlog situation, only two cars will be allowed per CWB permit book holder.
- For rye, flax and canola to Thunder Bay, the allocation will be 10% of the weekly movement to terminals in the order the applications were received.

In a backlog situation, only one car will be allowed per permit book holder.

- For canola to Vancouver, applications will be allocated based on the producer demonstrating that their grain is committed to an export sale or to a sale for domestic consumption.

Grain Dealer Allocations

Grain dealer cars are allocated based upon the dealers indicating to the Grain Transportation Agency (GTA) that they have confirmed sales and need to move the product into a terminal position. Once the GTA has allocated the car to the dealer, the dealer must provide the CWB with the detailed logistics (train run, shipping point, number of cars, grain and destination) regarding loading and planned movement. The CWB then allocates the cars to the appropriate train run. If an allocation of dealer cars causes the number of cars to exceed the train run maximum, the CWB grains are shifted from that particular train run.

New Elevators

If a track loading system is a "new" primary elevator, then for the first year of operation the new elevator is allocated cars on the basis of the space car formula (ie. the company will be entitled to an allocation to bring them to the average weekly space on the train run to a maximum of 50 cars/week). After year one, the new station's allocation is based on a combination of space and weighted average handling percentage, identical to other elevators.

New Stations With Only Augers and Bins

In cases where companies set up an auger and bins at a site previously not operated by the company, the company will be allocated whatever cars it needs to handle the non-Board grains it places at the station. The company will be given three Board grain cars as free cars whenever there is a general Board allocation on the subdivision. Any cars allocated for non-Board grains will reduce the CWB's grain entitlement accordingly. After the first year, the allocation will be based on the company's weighted average handling percentage.

Other Regulations and Codes

In addition, the following listing of codes and regulations should be consulted when constructing a track loading site:

-local building code
-local electrical code
-local anti-pollution regulations
-labour standards (Labour Canada and Workmen's Compensation).

Chapter 6

Mobile Elevator/Grain Services Unit

I. The Prototypes

Both United Grain Growers (UGG) and the three prairie pools have developed experimental mobile grain testing, weighing and transfer units that can be used to purchase grain and load it into semi-trailer trucks in the producer's yard. The prairie Pool unit called Mobiload has been used sporadically throughout the winter of 1994. UGG's unit has not yet used their unit. It should be stated that description of the system components is impossible to obtain from either company as the manufacturer has patents pending on the design and components.

"Mobiload" is pictured in Figure 6.1. This unit has an office which is equipped to grade for protein, moisture and dockage and issue a grain receipt and cash ticket. The design of Mobiload necessitates that a semi-trailer truck accompany the unit to haul the grain away. This design will require more yard space than the UGG unit. It will also have higher costs associated with requiring a separate truck and trailer. The estimated cost of the Mobiload unit is $175,000 to $200,000. In addition to bringing the elevator to the farm, this unit can be set up at a track loading site. In this case, producers would haul their grain to Mobiload for transfer into hopper cars. To facilitate this type of usage, producers and the grain company would have to know the grade of the grain prior to delivery at the track loading site.

The UGG unit is illustrated in Figure 6.2. Its cost with one unit with trailer is approximately $200,000. This unit differs from Mobiload in that it does not have an office and moves with the trailer from yard to yard. Mr. Ken Ganczar of UGG views this unit as ideal for taking grain from the field or yard site and moving it to feed mills, crushers and other users. This service would be particularly suited to canola and specialty crops. UGG does not envision this unit as moving grain to an elevator as it would result in double handling. If the grain were moving to

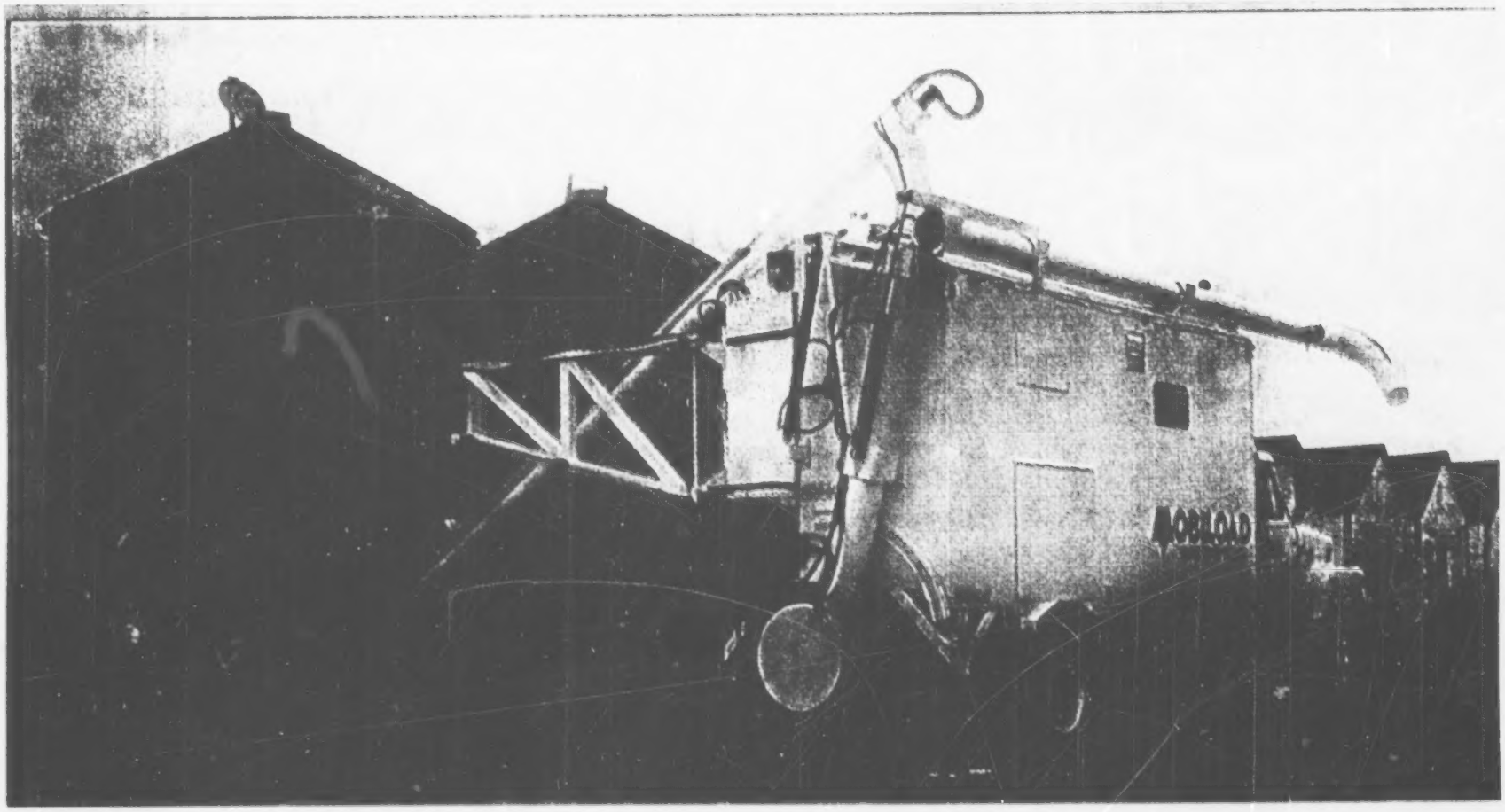


Figure 6.1: Mobiload

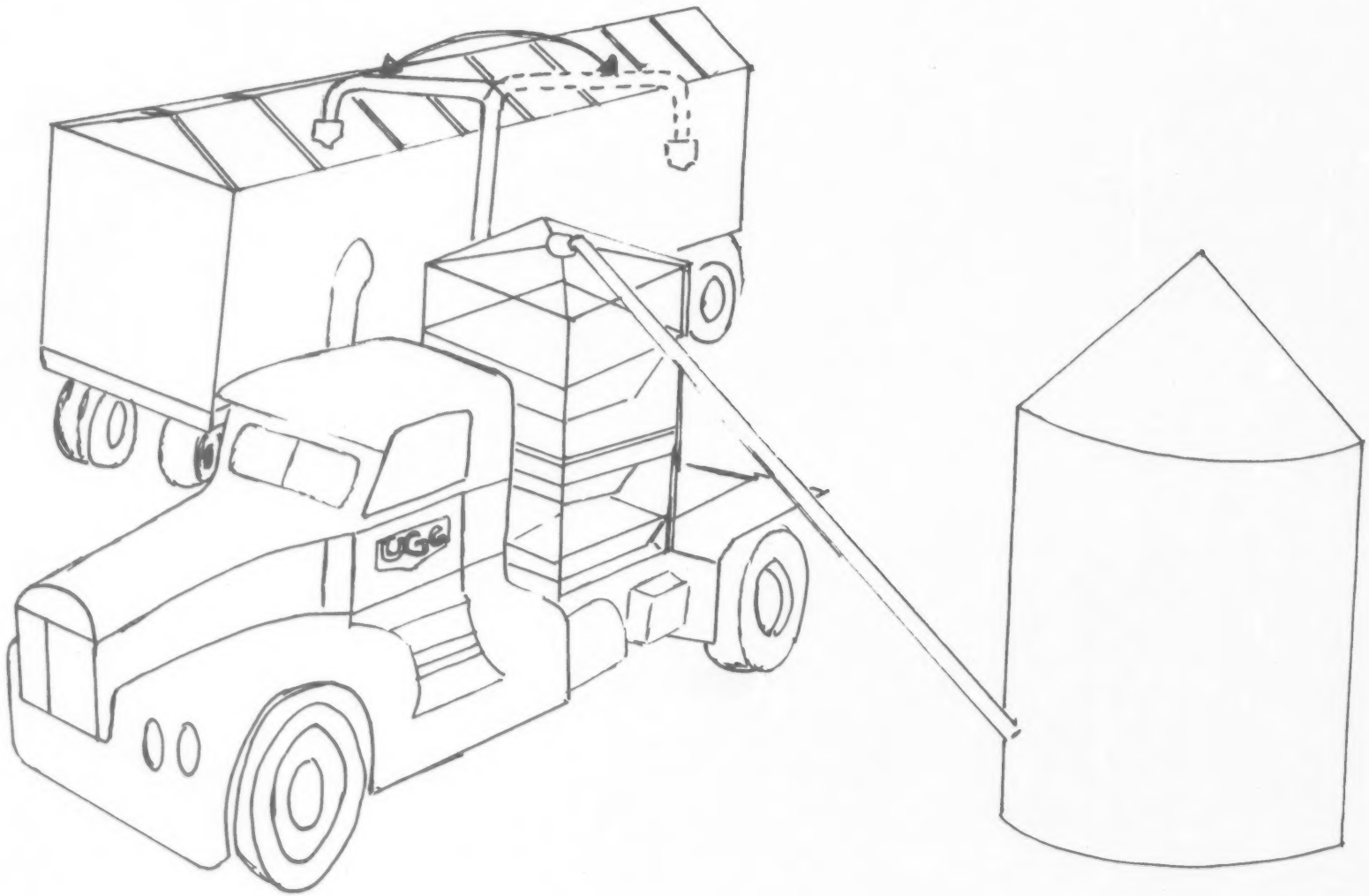


Figure 6.2: United Grain Growers Mobile Unit

an elevator, arrangements would simply be made to use a semi-trailer truck. The mobile unit could be used to service areas where branchlines have been abandoned or in areas where the company does not have an elevator and would like to enter into direct competition with other companies. This unit can also be used as a marketing tool to sell and deliver other company services such as seed and fertilizer sales. This potential for backhaul could reduce the operating costs of the unit on a per tonne of grain hauled basis. The margins realized from grain sales, types of commodities handled and sales of other services (seed, chemicals and fertilizer) will influence the economics of these units.

Like Mobiload, the UGG unit will operate under a primary elevator license and can handle both Board and non-Board grains. Mr. Ganczar advises that the CWB and CGC were accommodating as the regulations specify traditional country elevators. The UGG unit has a load sensor weigh scale behind the trailer cab. Weigh scale technology had prevented this unit from being developed earlier. This weigh scale has been approved by Weight and Measures for legal trade. Grain is augered from the farmer's bin into the scale for weighing. An automated sampler in the weighing unit collects a representative grain sample for the driver to grade. The identical dockage and moisture testing equipment found at traditional elevators is also used by the mobile unit. The driver will fax from his cab to the nearest company elevator the information on the grade, dockage, moisture content and weight of the grain. The elevator will fax back to him the detail to record in the cash ticket he will manually write for the producer. Future plans include the installation of an on-board computer to print the cash ticket.

Mr. Ganczar estimates that their unit will handle about 40 000 tonnes of grain annually once the usual start-up problems are addressed. UGG has not yet established the fee it will charge producers. It is possible that the grain companies may not charge a variable rate based on distance of haul. The rate may also depend on whether other services are purchased or not.

These mobile elevator units will be similar in size to a semi-tractor/trailer unit. As the carrying capacity of the UGG unit will be similar to a semi, it will be

subject to the same weight restrictions that five axle units experience every spring.

II. Costs of Mobile Elevator/Grain Services Unit

Currently, the industry has extremely limited experience with the mobile elevator units and their operating costs. To estimate the costs of these units, the analysis will be based on estimated daily mileage developed by A.T. Kearney and some of the 1993 operating costs of trucks developed by Trimac Consulting Services Ltd. for Transport Canada.

The following are the assumptions used to estimate the costs of operating these mobile units:

(a) because of the physical differences between the UGG unit and Mobiload, the capital costs will have to be calculated differently. The UGG unit will have $155,000 allocated to the tractor and $45,000 allocated to the trailer. Mobiload will be assigned a value of $180,000. Similar to the Trimac methodology, a tractor unit will be depreciated 80% with an assumed life span of seven years (Trimac uses 5 years but the fewer miles for this unit compared to a truck suggests that 7 years would be reasonable). A trailer unit will be depreciated 80% with an ten year timeframe (Trimac uses a depreciation rate of 1% per month over 8 years. Again because of the lower usage, it is assumed 10 years would be reasonable.)

(b) travel will be 60% on gravel roads and 40% on paved roads.

(c) an interest cost equal to 6% of the value of the assets identified in (a) above will be assessed. For the UGG unit, this amount will be $12,000 annually while for the Mobiload, it will be $10,800 annually.

(d) distance travelled will be 175 km. day for 130 days/year for a total distance of 22,750 km. for part-time use and double this figure for full-time use. As the Trimac costs assume 80,000 km. travelled in a year, the operating costs will be prorated to the appropriate mileage figure. It will further be assumed that the variable costs for the UGG unit and Mobiload will be identical. In fact, if the fuel consumption of Mobiload is closer to a standard two axle truck than a five axle unit, then Mobiload will have slightly higher variable costs.

(e) license costs will be based on government licensing fees of $2,378 for the tractor and $32 for the trailer. Insurance costs are $1,100 for the first $15,000 and $19 per $1,000 of value thereafter for the tractor and $433 for the first $15,000 and $19 per $1,000 of value thereafter for the trailer.

(f) cost of driver (and benefits) for full-time employment would be $43,750 ($35,000/year plus 25% for benefits).

(g) no costs shall be allocated to administration expenses associated with the central office or nearest primary elevator.

It is assumed that the cost of short hauls (less than 60 km.) versus long hauls (60 km. or more) would be higher given the labour component associated with loading and unloading times. An example may be found in Appendix V. This variation between a short and long haul will not be calculated as it will be reflected in the number of trips and total tonnage anticipated in a year. If the reader so wished, he could modify the anticipated annual tonnages to reflect the higher cost of a short haul situation.

Table 6.1 illustrates the calculations for the UGG mobile elevator unit excluding labour, insurance, administration and interest costs. The total cost for the variable costs, depreciation and licenses is $37,753 for half-time use and $47,019

for full-time use. Table 6.2 provides total costs if the unit handles 40 000 tonnes or 80 000 tonnes with different labour costs. The results indicate that if one assigns no labour cost, operates 130 days per year and has an annual volume of 40 000 tonnes, the cost per tonne would be $1.24. If a driver was paid for 26 weeks of work (half-time), the cost would be $1.79/tonne and, if the driver was hired on a full-time basis and the unit operated 260 days per year, the cost would be $2.57/tonne. To allow comparisons to the A.T. Kearney study which assumed the volume handled was 80 000 tonnes annually, these figures would be halved (ie. $0.62/tonne for no labour cost, $0.90/tonne with part-time labour and $1.28/tonne for full-time staff).

Similar calculations were done for the Mobiload unit. Table 6.3 summarizes the variable costs for Mobiload. Its annual variable cost is estimated at $34,080 for half-time use and $40,976 for full-time use. As shown in Table 6.4 with an annual volume of 40 000 tonnes and operating 130 days per year, the Mobiload unit would have costs per tonne of $1.12 with no labour and $1.67 with part-time staff. Assuming the unit operates 260 days per year and 40 000 tonnes per year volume, the cost would be $2.39/tonne with full-time staff. If the annual volume handled was 80 000 tonnes, then these figures would be $0.56 with no labour and 130 days per year, $0.83 with part-time staff and 130 days per year and $1.19 with full-time staff and 260 days per year. Because Mobiload requires a semi-trailer unit to haul the grain, an additional amount should be included in the figures to present the cost of trucking the grain. Based on industry charges, $3/tonne was used in the analysis. With 40 000 tonnes of annual volume, the total cost, including commercial trucking of the grain, would therefore be $4.12/tonne (no labour/part-time use), $4.67/tonne (part-time labour/part-time use) and $5.39/tonne (full-time staff/full-time use). If the volume was 80 000 tonnes annually, these figures would be $3.56/tonne (no labour), $3.83/tonne (part-time) and $4.19/tonne (full-time).

Table 6.5 summarizes the break-even analysis for the two mobile elevator units. The analysis considered three different fees--$5/tonne, $6/tonne and $7/tonne. With full-time staff, the UGG unit would require a volume of about 20 600

tonnes at $5/tonne to cover costs. If the fee charged were $7/tonne, this break-even volume would decline to about 14 700 tonnes. The Mobiload unit had comparable break-even volumes to the UGG unit, if one ignores a commercial trucking cost of $3/tonne. Once the commercial trucking cost of $3/tonne is deducted from the revenue, the Mobiload would require about 23 900 tonnes if the fee assessed were $7/tonne and over 47 700 tonnes at a fee of $5/tonne to break-even. Given anticipated annual volumes of 40 000 tonnes, the Mobiload unit would have to charge rates slightly higher than $5/tonne to cover all costs including custom trucking.

Mobiload or the UGG unit could be used as a track loading system in competition to or to replace existing traditional elevators. In this case, the company would either install storage facilities or producer deliveries would have to be coordinated with the car spottings. Nearby elevators to keep the business may discount their elevation charges.

Table 6.1 Estimated Operating Costs of UGG Mobile Elevator Unit

	Paved Road Cost	Gravel Road Cost	Total Cost
Variable Costs for Tractor (130 days/year)	dollars		
fuel	1,749	2,623	4,372
repairs	569	1,025	1,594
cleaning	26	39	65
transport	107	176	283
tires	164	418	582
Variable Costs for Trailer (130 days/year)			
repairs	448	807	1,255
cleaning	55	82	137
transport	62	93	155
tires	237	586	823
Variable Costs for Tractor and Trailer for 130 days (part-time use)			9,266
Variable Costs for Tractor and Trailer for 260 days (full-time use)			18,532
Depreciation			
tractor			17,714
trailer			3,600
Licenses			
tractor			2,378
trailer			32
Insurance			
tractor			3,760
trailer			1,003
Total Cost Excluding Labour			
Part-time Usage			**$37,753**
Full-time Usage			**$47,019**

Table 6 2 Estimated Total Costs of UGG Mobile Unit

	Part-time Use With No Labour	Half-time Use With Labour	Full-time Use With Labour
Interest	$12,000	$12,000	$12,000
Labour cost	0	21,875	43,750
Other costs	37,753	37,753	47,019
Total Cost	$49,753	$71,628	$102,769
Cost/tonne at 40 000 tonnes	$1 24	$1.79	$2 57
Cost/tonne at 80 000 tonnes	$0.62	$0.90	$1 28

Table 6 3: Estimated Operating Costs of Mobiload Unit

	Paved Road Cost	Gravel Road Cost	Total Cost
Variable Costs for Tractor (130 days/year)	dollars		
fuel	1,749	2,623	4,372
repairs	569	1,025	1,594
cleaning	26	39	65
transport	107	176	283
tires	164	418	582
Variable Costs for Tractor and Trailer for 130 days (part-time use)			6,896
Variable Costs for Tractor and Trailer for 260 days (full-time use)			13,792
Depreciation			
tractor			20,571
Licenses			
tractor			2,378
Insurance			
tractor			4,235
Total Cost Excluding Labour			
Part-time Use			**$34,080**
Full-time Use			**$40,976**

Table 6.4: Estimated Total Costs of Mobiload

	Half-time Use With No Labour	Half-time Use With Labour	Full-time Use With Labour
Interest	$10,800	$10,800	$10,800
Labour cost	0	21,875	43,750
Other costs	34,080	34,080	40,976
Total Cost	$44,880	$66,755	$95,526
Cost/tonne at 40 000 tonnes	$1.12	$1.67	$2.39
Cost/tonne at 80 000 tonnes	$0.56	$0.83	$1.19

Table 6.5: Break-even Analysis for UGG Unit and Mobiload, Tonnes Per Year

	Fee Charged Per Tonne		
	$5	**$6**	**$7**
UGG Unit			
no labour	9 951	8 292	7 108
part-time	14 326	11 938	10 233
full-time	20 554	17 128	14 681
Mobiload	**No allowance for commercial truck**		
no labour	8 976	7 480	6 412
part-time	13 351	11 126	9 536
full-time	19 105	15 921	13 647
Mobiload	**Less $3/tonne for commercial truck**		
no labour	22 440	14 960	11 220
part-time	33 378	22 252	16 689
full-time	47 763	31 842	23 882

Note: the above break-even analysis does not consider any reductions in costs due to backhauls of seed nor sales of chemicals or fertilizer.

III. Other Transportation Units

While investigating new technologies for the grain handling and transportation system, information was received regarding a new "hopper" car developed by D.N.A. Roadtrans Systems Inc. This car called the chameleon has soft sides

which can be raised or lowered using an hydraulic system. Two flexible fabric tanks made of Trevira provide flexibility in transporting dissimilar products. The chameleon is capable of moving grain and then once emptied can be converted into a flat deck car for transporting other goods. The unit can carry up to 2,800 cubic feet of dry bulk materials. This system can be used for both road and rail.

The company which did the design and initial testing of the chameleon has provided a complete package of the chameleon's specifications and a video tape which may be found in the supplementary information package.

Chapter 7

Implications for the Grain Handling and Transportation System

I. Comparison With Conventional and High Throughput Elevators

A. Producer Track Loading Systems

The A.T. Kearney study estimated that the average cost of the primary elevator was $7.28/tonne. It is recognized that new elevators with higher capital costs could have costs closer to $8.00/tonne. Comparing an average cost of $7.50/tonne for a primary elevator to the costs associated with track loading systems as developed in Chapter 4 of this report, one can see:

(a) the lowest cost producer track loading system (ignoring revenue from screenings or incentive rates) would be the permanent auger facility with the component approach. Its cost at $2.89/tonne for a company administered car could be $4.61/tonne less than the primary elevator. This difference would increase to $6.03/tonne if the producer administered his own car.

(b) the highest cost producer track loading system (ignoring revenue from screenings or incentive rates) would be the mini-elevator with a capacity of two hopper cars per hour with a cost of $5.37/tonne for a company administered car. Its cost is $2.13/tonne less than the average primary elevator at $7.50/tonne. If the producer administered his own car, then the difference would increase to $3.55/tonne.

(c) based on a hopper car containing 88 tonnes of grain, the producer can save between $187.44/car and $530.64/tonne (depending on the type of facility and whether or not he self-administers his car) if he uses a track loading system compared to the primary elevator.

(d) assuming the higher cost primary elevator at $8.00/tonne and deducting the revenue from dockage fee ($3.11/tonne) and savings from incentive rates for multiple car spots ($1.75/tonne), the net cost would be $3.14/tonne or $6.25/tonne if only incentive rates are considered. Comparing this to the mini-elevator with a three hopper car per hour capacity and deducting only the incentive rate of $1.75/tonne would yield a net cost of $1.14/tonne for a self-administered car and $2.56/tonne for a company administered car. The track loading system, without considering any revenue from cleaning grain, is therefore $3.69/tonne for a company administered car and $5.11/tonne for a self-administered car less costly than a high throughput elevator.

Table 7.1 presents the break-even volumes for the various track loading systems if they charged a fee equivalent to the $10.75/tonne ($946/car) the maximum primary elevators are permitted to charge for receiving, elevating and loading out wheat in 1994/95 . The variable costs were based on the cost per car multiplied by the number of hopper cars anticipated to be loaded at each site. The smallest break-even tonnage for a track loading system is 369 tonnes or about 4 hopper cars. The primary elevators are able to realize not only the $10.75/tonne fee for elevation but also $3.11/tonne for dockage. The smallest capacity primary elevator has a break-even of with 4 002 tonnes or about 46 hopper cars. Excluding the dockage revenue would result in a break-even of 5 160 tonnes or 59 hopper cars. The largest break-even tonnage for a track loading system is 8 554 tonnes or about 97 hopper cars compared to the inland terminal requiring 47 746 tonnes or 543 hopper cars if dockage revenue is included and 61 559

tonnes or 700 hopper cars if only elevation charges are considered.

Table 7.1: Break-even Analysis For Track Loading Systems With Fee $10.75/tonne

Track Loading System	Fixed Cost $	Variable Cost $	Total Cost $	Break-even (tonnes)
permanent auger-component approach	2,162	1,800	3,962	369
permanent auger-self-contained unit	2,265	1,800	4,065	379
drive-over dump pit	3,876	9,857	13,733	1 278
mini-elevator portable auger	12,311	11,201	23,512	2 187
mini-elevator utility auger	12,057	11,364	23,421	2 179
mini-elevator bucket elevator with augers	19,858	12,648	32,506	3 024
mini-elevator bucket elevator with belt conveyors	27,164	11,843	39,007	3 629
mini-elevator 2 hopper cars/hr.	67,653	21,684	89,337	8 311
mini-elevator 3 hopper cars/hr.	67,664	24,291	91,955	8 554

The maximum tariffs permitted for 1994/95 for cleaning grain are listed in Appendix IV. For wheat, the fee for this service is $13.86/tonne if the screenings are returned to the owner and $3.11/tonne if the screenings are not returned to the owner. By charging for this service, the producer track loading site can generate additional revenue and at the same time provide the producer with comparable service at a lesser cost.

B. Mobile Elevator/Grain Services Unit

To compare the mobile elevator unit to the primary elevator system, one would have to include in the total cost of the primary elevator the cost of moving the grain from the farm to the elevator. It has been estimated that the operating and capital costs associated with the movement of grain from the farm to the elevator range between $5.00 and $5.50/tonne and the cost of the primary elevator is between $7.25 and $8.00/tonne. The mobile elevator cost is based on 40 000 tonnes handled annually with full-time staffing. The $3.00/tonne trucking fee represents the cost of a commercial semi-tractor and trailer. Table 7.2 compares the cost of the primary elevator system with this trucking from farm to elevator included to the cost of the UGG's and prairie Pool's mobile elevator units.

In terms of costs, even though the prairie Pool's unit requires hiring custom truckers to move the grain, it is still less expensive to operate than the traditional country elevator.

From a producer's perspective, if he were charged $10.75/tonne to use the country elevator system and incurred an additional $5.00 to $5.50/tonne to move his grain from the farm to the elevator, his total cost would be $15.75 to $16.25/tonne. If the mobile elevator unit charges less than this amount, the producer will be realizing a saving from this new and innovative approach.

Table 7.2: Comparison of Total Costs of Primary Elevator System Including Trucking to Elevator Versus the Mobile Elevator Units

	Elevator Cost $/tonne	Trucking Cost $/tonne	Total Cost $/tonne
Primary Elevators	7.25-8.00	5.00-5.50	12.25-13.50
Mobile Elevators			
UGG	2.57	n.a.	2.57
Prairie Pools	2.39	3.00	5.39

II. Factors To Consider When Selecting A Location

When selecting a site for a potential track loading facility, the individual should consider the following:

(a) who is the competition?

-plot on a map the location and size of each elevator in the surrounding area. Consider also nearby high throughput elevators which would be your competition. Is there enough production in the area to support these elevators and accommodate your operation?
-identify if any grain company is currently not present in the area. Are there affiliations which you could develop to custom load hopper cars for this company? If so, would they be willing to finance some of the project or guarantee a specific number of cars shipped per year?
-what are the fees the existing elevators are charging? What will be your anticipated fees?
-how many producer cars originate in your area? Who is currently providing this service and at what cost? Can you match this competition?

(b) what are the potential opportunities?

-what is current production of cereals and specialty crops in your area and what are the anticipated production trends?
-can you provide services which existing facilities are unwilling or unable to do eg. cleaning grain or bagging specialty crops?
-where will future markets be --international or in the U.S.?

(c) what should one consider when selecting a site?

-is the site on a main line or a branchline? If its on a branchline, will it be subject to abandonment in the near future. If so, is there any chance it may become a short line operation?
-how many car spots does the location have? To be able to realize

the incentive rates for multiple car spots, a minimum of 18 spots is required. This may be important if competition from existing grain companies becomes more intense.

-does the site allow access to additional car spots or have the potential for further expansion of the facility or number of car spots?

-is the site easily accessed by the producer? Is the road network capable of drawing producers from a wide catchment area? Can the road network accommodate large semi-trailers?

-is purchase of the land possible or is a lease required?

-will the site require extensive levelling and preparation to be usable?

(d) what should one consider when selecting equipment?

-is flexibility a consideration? Do you want the structure to be movable to another location at a later point in time? This may be an important consideration if the location is on a branchline or the site is leased rather than owned.

-how much capital do you have? Can a group of producers form a partnership to develop a facility suitable to the area's needs? If not, then try to select a design which allows for future expansion.

-remember that you will be required to load the hopper cars within an eight hour period. Design your facility (both in terms of number of storage bins and bushels per hour capacity) keeping in mind the number of car spots and this requirement.

-consider potential revenue such as cleaning of grain when evaluating the costs and benefits of equipment. This is particularly important if no other company is providing this service.

-will you be handling cereal crops only or also specialty crops? If you are handling specialty crops, will they be feed or food quality? Specialty crops which are for human consumption require special care when being handled. This necessitates different equipment with higher costs.

(e) what should you consider about licensing?

-do you intend to only handle grains for the owners? If so, then you will not require a business license nor any licensing from the CGC or CWB.

-do you intend to charge a custom fee only? If so, then you must purchase a business license. If your hopper bins are of a size to be equivalent to a hopper car and you load them with one producer's crop only, then you will not require a license from the CGC or CWB.

-do you intend to purchase grain? If you will only purchase non-Board grains and specialty crops, then only a CGC license is necessary. If you will handle Board grains, then in addition to the CGC license, CWB must approve your facility.

These decisions with the exception of the facility's equipment are equally relevant when selecting an area to operate a mobile elevator unit in. Although the mobile elevator is best used to move grain to an end user, it can also be set up at a track loading site to load hopper cars. To facilitate loading at a site, it may be desirable to have storage space available to ensure sufficient grain when the hopper cars are spotted.

III. Constraints on Development of These Systems

Constraints to the development of these systems can be categorized into commercial constraints and policy constraints.

The commercial constraints may be summarized as follows:

(a) the grain companies may resist the development of track loading systems and producer owned mobile elevator units by undercutting the prices offered. The advantage of having an integrated unit form country point to port is that losses incurred at one location can be cross-subsidized by other activities of the company.

(b) the producer could have troubles marketing his grain if the major companies refuse to handle his product at their export terminals. Terminal authorization is essential to the producer track loading system.

(c) the interest of the railways to permit the establishment of producer track loading systems has yet to be determined. Given potential downsizing of the rail network, the railways may be reluctant to lease or sell a site if they believe it will result in being forced to keep a high cost, low volume branchline open.

(d) response of producers to track loading facilities and mobile elevator units will depend on how they restructure their farming operations in light of policy changes. Increased movement of specialty crops and non-Board grains southward may minimize the potential volume a system can draw from.

The policy concerns relate to WGTA reform and the uncertain environment producers and the industry face. The federal government recently announced that the railway subsidies would come to an end on August 1, 1995. Prairie grain producers will be paying higher freight rates subject to an overall legislated maximum rate formula for a transitional period, until July 31, 2000. The rate regulations will be sunsetted so that the National Transportation Act will apply after the transition period. This Act will have shipper-oriented provisions to improve access to competitive transportation services if the shipper is captive to one railway. In effect, producers will immediately pay the full WGTA rate and will in the future face commercial rates for moving their grain.

Elimination of the WGTA and the introduction of maximum freight rates for a transitional period do not ensure a stable operating environment. Replacement of WGTA rates with commercial rates will dramatically change the freight costs producers will face at some country points. To realize the best rate possible, the producer track loading system will have to be able to load multiple numbers of

cars and/or be located on a high volume branchline or main rail line. Ideally when selecting a location, the producer should consider all these factors.

The problem is further compounded when one realizes that the abandonment protection orders will be lifted on all lines (including non-grain lines) effective December 31, 1995. Questions remain as to what the revised rail network will be given lifting of prohibition orders. When considering the location of a future track loading site, the operator must evaluate the longevity of the rail line. Abandonment may provide more opportunities to use mobile elevator units to direct ship to end users. The potential to use available funding assistance to offset the cost of a mobile elevator unit when a line is abandoned has yet to be established.

Producer cars have been the subject of debate for a number of years. Some contend that spotting small numbers of cars results in higher costs to the overall system. However, the primary elevators usually spot 5 to 6 cars on average. Often, producer cars are spotted at the same time as cars are spotted for an elevator. Participants have found it difficult to identify the added costs associated with producer cars. Changes to the car allocation process have yet to be determined by the federal government but they are coming. The federal government has announced it will abolish the GTA and replace it with an industry managed and funded agency. There will also be a review of the car allocation system, the possible disposal of the government grain cars, and the transportation function of the CWB. It is certain that the grains industry would like to see a mechanism which would reduce car cycle times, assess demurrage charges for use of cars for storage, introduce directional loading programs and maximize blocks of single commodity loadings.

The future of producer cars in this changing environment has not been clarified. Changes which could see the adoption of a price bidding system similar to the U.S. would compromise the producer's ability to get hopper cars. If a bidding system were adopted, it would be imperative that the track loading systems be capable of realizing incentive rates to bid for hopper cars.

Although a one-time ex gratia capital payment of $1.6 billion will be paid to prairie farmland owners in the spring of 1996 (the federal government is currently reviewing the proposal to pay the landowner given opposition from farm organizations), the compensation of approximately $18 to $20/acre for Saskatchewan will be equivalent to the increased freight rate the producer will face on August 1, 1995. For producers who rent land, they cannot be assured that they will realize any of the payment through reduced rental rates. For those producers who own the land they farm, even if he invests this money, the interest earned will not offset the higher freight costs he will face. The producer then will have to consider mechanisms to reduce his costs of production and marketing, restructure his farming operation and explore opportunities for more diversification and other value-added activities. Canola, flax and specialty crops will become increasingly important in Saskatchewan's crop mix. For this reason alone, the design of the track loading system should be capable of handling all types of crops.

IV. Conclusion

Track loading systems offer great potential to the producer as he can substantially reduce the costs of marketing his crop compared to primary elevator system. This lower cost of marketing will help offset some of the increased burden the grain producer will face due to WGTA reform. In addition, the mobile elevator units will save money and permit direct marketing to end users of the grain or specialty crop.

The future is difficult to project in the changing policy environment and given the dynamics of the commercial world. The key to success in any venture is flexibility and adaptability. These concepts must be the focal point in the development of a new grain handling and transportation infrastructure.

IV. Conclusion

Track loading systems offer great potential to the producer as he can substantially reduce the costs of marketing his crop compared to primary elevator system. This lower cost of marketing will help offset some of the increased burden the grain producer will face due to WGTA reform. In addition, the mobile elevator units will save money and permit direct marketing to end users of the grain or specialty crop.

The future is difficult to project in the changing policy environment and given the dynamics of the commercial world. The key to success in any venture is flexibility and adaptability. These concepts must be the focal point in the development of a new grain handling and transportation infrastructure.

Appendix I

Table 1: Comparison of Production Technologies of Major Grain-exporting Countries

Activity	Argentina	Australia	Brazil	Canada	France	United States
Soils and topography	Flat, fertile soils in the corn belt. Rolling land farther south in wheat and sorghum area. Long rotations, including legume pasture. Soybeans and wheat are often double-cropped.	Major wheat production areas include southern and eastern coast and western Australia. Rolling, dry land. Extended rotations with cover.	Expanding production on newly cleared soils. Long slopes, year-round erosion and leaching create more problems in maintaining fertility. Extensive terracing required.	Wheat grown for export in four soil zones in western Canada. All wheat grown under dryland conditions.	Major wheat production in north and southwest of Paris on stable, low-erosion soils. Rolling land further south is corn-producing.	Major production areas are on stable soils. Low erosion. Fertility stabilized. Soybeans are usually in rotation with corn or other crops. Winter wheat grown under dryland conditions.
Cultural practices	Limited use of fertilizers on corn, increasing use on wheat. Limited use of herbicides and insecticides. Mechanized tillage, seeding, and cultivation.	Phosphatic fertilizers, insecticides, and herbicides used as needed. Mechanized soil preparation.	Fertilizers, insecticides and herbicides used as need. Mechanized soil preparation, seeding and cultivation.	Fertilizers, insecticides and herbicides used as needed. Mechanized soil preparation, seeding and cultivation.	High use of fertilizers, insecticides, and herbicides. Mechanized soil preparation, seeding and cultivation.	Fertilizers, insecticides, and herbicides used as needed. Mechanized soil preparation, seeding and cultivation.
Harvesting	Self-propelled combines.	Self-propelled combines.	Self-propelled combines.	Self-propelled combines. Wheat crop is swathed before harvest.	Self-propelled combines.	Self-propelled combines. Wheat crop in Northern plains is swathed before harvest.
On-farm storage	Only 5-10 % stored on farms. Only large farms use on-farm storage.	Virtually no on-farm storage.	Virtually no on-farm storage.	On-farm storage.	Limited on-farm storage.	On-farm storage available for about 50% of corn and soybeans.

Source: Office of Technology Assessment, U.S. Congress, 1989

Table 2: Comparison of Handling Technologies and Practices at First Point of Receipt of Major Grain-exporting Countries

Activity	Argentina	Australia	Brazil	Canada	France	United States
Receiving	Truck dumps and hoists at larger facilities. A few receiving stations lack hoists. Waiting lines are common at harvest.	Truck dumps and hoists for farm wagons and trucks	Truck dumps and hoists at larger facilities. Many vehicles unloaded by hand	Truck dumps and hoists for farm wagons and trucks	Truck dumps and hoists for farm wagons and trucks	Truck dumps and hoists for farm wagons and trucks
Drying	Majority of corn and some soybeans and wheat are dried in high-temperature dryers. Nearly all country elevators have dryers.	Generally do not need to dry grain. No dryers at bulk handling authority facilities	Majority of soybeans dried using wood or coal burning dryers.	The majority of wheat is dried using propane dryers and stored on farm.	Some drying of wheat if harvested above 15% moisture. Majority of corn dried.	Majority of corn is dried and stored on farms. Most of the corn delivered at harvest is dried by the first handler. Little drying of soybeans or wheat
Cleaning	Most grain is cleaned to less than 1% foreign material	Generally do not clean No cleaners at bulk handling authority facilities	Soybeans are cleaned if necessary to meet the 1% foreign material standard. Corn is cleaned to less than 1%.	Very little cleaning done at first point of receipt.	Most wheat cleaned going into country elevator and some cleaned going out. Corn routinely cleaned because of broken kernels.	Generally, grains is not cleaned when it comes off the farm. It is placed in bins according to quality so that it can be blended with grains of different quality when loaded out.

Activity	Argentina	Australia	Brazil	Canada	France	United States
Storage	Flat and upright storage.	Upright, flat and bunker style. Varies by state.	Flat and upright storage. Flat predominates.	Vertical cement bins, flat storage and steel tanks. Vertical predominates.	Upright storage predominates with some flat storage.	Flat and upright storage. Upright predominates.
Handling	Use augers, conveyors, belts and vertical legs.	Use augers, conveyors, belts and vertical legs.	Use augers, conveyors, belts and vertical legs.	Use augers, conveyors, belts and vertical legs.	Use chain conveyors rather than belts.	Use augers, conveyors, belts and vertical legs.
Transportation to ports	Truck and rail choice determined by cost, shortage of rail service and deteriorating rail infrastructure. About 5 % is currently using rail.	Most wheat is moved by rail, some by truck.	Truck predominates. Water transport available only in south.	Grain predominately moved by rail.	Grain transported mainly by truck.	Trucks for short hauls Rail and water for long distance.

Source: Office of Technology Assessment, U.S. Congress, 1989 and additional information for author.

Table 3: Comparison of Handling Technologies and Practices at Export of Major Grain-exporting Countries

Activity	Argentina	Australia	Brazil	Canada	France	United States
Storage	Vertical silos. Few bins for quality segregation.	Vertical storage segregated by quality Some flat storage and temporary facilities.	Vertical and flat storage. Small number of bins limits segregation by quality.	Vertical, cement bins predominate. Blending is limited as grades must be kept separate.	Upright bins predominate: storing according to end-use qualities.	Vertical storage with multiple bins, high speed in and out. Segregated by quality to expedite blending at time of shipping.
Drying	Grain dried by first handler. Dryers at export are seldom used.	No dryers at export facilities.	Grain dried by first handler; dryers at export seldom used.	Most export facilities have modest drying capacity.	Few export elevators have dryers, grain is conditioned by first handler.	Most export facilities have large drying capacity. Corn is often dried if received directly from the farmer. Soybeans and wheat are seldom dried.
Cleaning	Grain cleaned by first handler. Relatively small capacity cleaners.	No cleaners at export facilities.	Grain cleaned by first handler. Limited cleaning capacity.	Most cleaning of grain is done at export.	Most export elevators do not have cleaners; grain cleaned by first handler.	Most export facilities have capacity for cleaning. Grain (mostly corn) often cleaned prior to exporting.
Blending	Limited blending because of uniform grain received and lack of physical facilities for blending.	Limited blending.	Limited blending because of uniform grain received and lack of facilities.	Blending at primary elevators, but at export only 2% of higher grade can be a blend from a lower grade.	Some blending of wheat moving to export, but limited financial incentive to blend.	Normal practice Economic incentive to blend due to extremes in quality of grain accepted into the system.

Source: Office of Technology Assessment, U.S. Congress, 1989.

Table 4: Comparison of Institutions and Regulations Affecting Grain Quality of Major Grain-exporting Countries

Activity	Argentina	Australia	Brazil	Canada	France	United States
Seed variety control	Committee of government and industry must approve agronomic properties. Quality factors of minor influence.	Formal mechanism followed as a prerequisite for release of varieties. Quality and agronomic criteria are used.	Committees with broad representation direct research and approve varieties. Quality is potential criterion, but currently not effective.	Formal mechanism used to license new varieties. Agronomic and quality criteria given equal weight in testing new varieties	Formal mechanism exists that regulates release of varieties based on agronomic and quality criteria.	No state or federal control. Release of varieties influenced to some extend by universities. The market largely determines the adoption of varieties.
Grain receival standards	Grain not meeting a specific minimum quality is rejected at first point of sale.	Wheat must meet minimum quality standards. If not, it is allocated to feed market.	Soybeans not meeting minimum quality are rejected at first point of sale.	Developed 8 grades for CWRS to differentiate quality. Lowest grade goes to feed market	Grain not meeting export contract specifications can be rejected by surveying company or receiving elevator.	None. All types of quality are acceptable with appropriate discounts for low-quality grain
Marketing by variety	Variety is not identified in marketing channel.	Very common--use variety control scheme to facilitate segregation by classes.	Variety is not identified in marketing channel.	Licensed grain must be visually distinguishable.	Very common. Variety often specified in wheat contracts	No mechanism exists for variety identification
Grain inspection authority	Junta Nacional de Granos--government agency responsible for agriculture.	Export Inspection Service of Department of Primary Industry	Private inspection agencies	Canadian Grain Commission (CGC)	Private inspection agencies	Federal Grain Inspection Service (FGIS, USDA)
Grade standards	Official standards established by Junta.	Official standards established by Department of Primary Industry	Official standards not used in export. Quality is based on Association Nacional dos Exportadores de Cereals contract	Grain standards established by CGC	No official standards. Only official quality criteria are requirements for intervention mechanism.	Official standards established by FGIS

Source: Office of Technology Assessment, U.S. Congress, 1989

Table 5: Comparison of Government Policies Affecting Grain Quality of Major Grain-exporting Countries

Activity	Argentina	Australia	Brazil	Canada	France	United States
Price	Government establishes minimum prices for farmers and exporters. Government also establishes premiums for high-quality grain	Guaranteed minimum price (GMP) is key price policy. It is established by class and provides differentials for quality. Lower qualities of wheat equated to feed values	Government establishes a minimum price prior to planting. It is adjusted during the crop year to account for inflation and political pressure.	Initial producer price is the principal price policy. Separate prices established for each grade of grain. Lower qualities of wheat equated to feed values.	Key policy is Intervention price which includes premiums and discounts for quality factors. Lower qualities of wheat equated to feed values.	Loan rate is principal price policy. Includes premiums and discounts for major grains, but has not ben responsive to market conditions
Farm Storage	Government policy through pricing does not encourage on-farm or inter-year storage	Use of GMP provides no incentives for delivery in post-harvest period, leading to minimal use of on-farm storage	No incentive to store grain on farm.	producer deliveries are regulated to primary elevators via quotas. On-farm storage is substantial	Farm policy has not encouraged development of on-farm storage and limited inter-year storage.	Farm policy over the last decade has tended to encourage on-farm storage and inter-year storage

Source: Office of Technology Assessment, U.S. Congress, 1989.

Appendix II

ABEL MANUFACTURING CO., INC.
P.O. BOX 757 • 1100 N. MAYFLOWER DR. • APPLETON, WI 54912-0757
PHONE (414) 734-4443
FAX (414) 734-1084

QUOTATION #18304 SHEET 1 OF 3

PIVOTAL PLUS CONSULTING LTD.
14 HARWICK LANE
WINNIPEG, MANITOBA R2J 3H1

ATTN: HEATHER GREGORY

DATE: FEBRUARY 28, 1995
F.O.B. APPLETON, WI
DEL: 7 TO 8 WEEKS AFTER DRAWING APPROVAL

We are pleased to quote the specifications and prices as follows:	*PRICE*

ABEL SQUARE BIN SYSTEM, USING OUR STANDARD SMOOTH-WALL, ALL BOLT-TOGETHER DESIGN WITH 45-DEGREE CORNERS FOR GOOD PRODUCT FLOWABILITY AND CLEAN-OUT.

SQUARE BOLTED, STEEL BINS		Bushels/Bin	Tons/Bin
4	10' x 10'	4025	99.8

- Capacity of bins is a usable capacity which does not include the hopper. Waterfull capacity would be considerably higher. Bin design is based on product weighing up to 45 lbs. per cu. ft. The tonnage listed is based on 40 lbs. per cu. ft. product.
- Straight sidewall height of bins is 49'-11", which is based on thirteen standard sections of bin panels.
- Bin sidewalls are fabricated of 10 & 7 gauge hot rolled steel.
- All exterior sidewall stiffeners to be standard "z" channel type stiffeners which are ideal for the application of steel siding. If the bin sidewalls will not be sided in, we recommend the use of 60 degree baffle-style stiffeners for a self-cleaning exterior.
- All interior stiffeners to be 60 degree baffle-style stiffeners for good product flow & easy clean-out.
- All outside vertical seams to be sealed with 2" wide gasket strips for a water tight installation.
- Bin hoppers are constructed of 1/4" hot rolled steel plate, 60 degree corner draw to 18" square discharge flanges.
- Bins have a 7 gauge hot rolled steel roof deck for field welding with necessary supports and is sloped for drainage.
- Roof deck accessories include a loose 22" square vented or sealed manhole per bin for field welding.
- All necessary hardware is included.
- All hot rolled steel bin components to be commercially cleaned (SSPC-SP1) and painted one coat shop paint. This paint is formulated to retard corrosion during

--GENERAL TERMS AND CONDITIONS--
PRICES: The above prices are firm for a period of thirty days from the date of quotation, but are subject to change, without notice, after that time. **SALES TAX:** This proposal does not include any sales, use or occupational tax that may be imposed by competent taxing authorities at any time, present or future. Payment of such tax is to be the responsibility of the purchaser unless specific provisions are made by the seller. **ERRORS:** Typographical and stenographic errors subject to correction. **DELAYS:** All quotations and agreements are contingent upon strikes, accidents, fires, availability of materials and all other causes beyond our control.

Mike Ramczyk

SIGNED Mike Ramczyk

ABEL MANUFACTURING CO., INC.

ABEL MANUFACTURING CO., INC.
P.O. BOX 757 ■ 1100 N. MAYFLOWER DR. ■ APPLETON, WI 54912-0757
PHONE (414) 734-4443
FAX (414) 734-1084

QUOTATION #18304 SHEET 2 OF 3

PIVOTAL PLUS CONSULTING LTD.
14 HARWICK LANE
WINNIPEG, MANITOBA R2J 3H1

ATTN: HEATHER GREGORY

DATE: FEBRUARY 28, 1995
F.O.B. APPLETON, WI
DEL: 7 TO 8 WEEKS AFTER DRAWING APPROVAL

We are pleased to quote the specifications and prices as follows:	*PRICE*
shipment and installation. After installation, we recommend that the exterior of the bins receive a new surface preparation, and new prime and finish coats that are suitable for customer's environment. Hopper interiors are normally un-painted.	
- The bin cluster is designed for future expansion on one 20'-0" side with additional corner angles and baffle style stiffeners per sketch.	
Estimated shipping weight: 86,400 Lbs. **PRICE -**	**$ 52,731.00**
STRUCTURAL STEEL TO SUPPORT THE ABOVE BIN CLUSTER	
The structure is 20'-0" square with an overall height of 19'-0" which makes a 68'-11" overall height to the top of the bins. It is designed to provide 3'-2" of clearance below the gathering hopper discharge flange. The structure is designed for Seismic Zone I and 90 MPH windloading conditions. It is designed for future bin expansion on one 20'-0" side with reinforced columns and beams to support the future bin loading. It is fabricated for bolted assembly, commercially cleaned (SSPC-SP3) and painted one coat of shop paint.	
Estimated shipping weight: 34,670 Lbs. **PRICE -**	**$ 26,548.00**
(The structural steel design prints are stamped by a professional engineer licensed in the state where the structure will be located. Foundation design assistance or plans can be provided at an additional cost.)	
OPTIONAL BIN ACCESSORIES	
Bin Top Service Railing. **WT: 792 Lbs.** **PRICE -**	**$ 1,073.00**
68' Service Ladder. **WT: 901 Lbs.** **PRICE -**	**$ 750.00**
64' Safety Cage. **WT: 896 Lbs.** **PRICE -**	**$ 745.00**
(2) Interm. Rest Platform. **WT: 966 Lbs.** **PRICE -**	**$ 778.00**
Bin Sidewall Bottom Flashing. **WT: 464 Lbs.** **price -**	**$ 652.00**

- - GENERAL TERMS AND CONDITIONS - -

PRICES: The above prices are firm for a period of thirty days from the date of quotation, but are subject to change, without notice, after that time. **SALES TAX:** This proposal does not include any sales, use or occupational tax that may be imposed by competent taxing authorities at any time, present or future. Payment of such tax is to be the responsibility of the purchaser unless specific provisions are made by the seller. **ERRORS:** Typographical and stenographic errors subject to correction. **DELAYS:** All quotations and agreements are contingent upon strikes, accidents, fires, availability of materials and all other causes beyond our control.

Mike Ramczyk

SIGNED _____

ABEL MANUFACTURING CO., INC.

ABEL MANUFACTURING CO., INC.
P.O. BOX 757 ■ 1100 N. MAYFLOWER DR ■ APPLETON, WI 54912-0757
PHONE 414-734-4443
FAX 414-734-1064

QUOTATION #18304 SHEET 3 OF 3

PIVOTAL PLUS CONSULTING LTD.
14 HARWICK LANE
WINNIPEG, MANITOBA R2J 3H1

ATTN: HEATHER GREGORY

DATE: FEBRUARY 28, 1995
F.O.B. APPLETON, WI
DEL: 7 TO 8 WEEKS AFTER DRAWING APPROVAL

We are pleased to quote the specifications and prices as follows:	*PRICE*
BIN DISCHARGE GATES	
(4) 18" Square, Roller Slide Gates, Rack & Pinion design with Hand or Chainwheel. **WT: 528 Lbs.** **PRICE** -	$ 1,312.00
(1) 18" Gathering Hopper, 4-to-1 design. **WT: 324 Lbs.** **PRICE** -	$ 335.00
AS AN OPTION, WE OFFER:	
OPTIONAL STRUCTURAL STEEL TO SUPPORT THE ABOVE BIN CLUSTER	
The structure is 20'-0" square with an overall height of 30'-0" which makes a 79'-11" overall height to the top of the bins. It is designed to provide 14'-2" of clearance below the gathering hopper discharge flange. The structure is designed for Seismic Zone I and 90 MPH windloading conditions. It is designed for truck drive-through service and for future bin expansion on one 20'-0" side with reinforced columns and beams to support the future bin loading. It is fabricated for bolted assembly, commercially cleaned (SSPC-SP3) and painted one coat of shop paint.	
Estimated shipping weight: 54,430 Lbs. **PRICE** -	$ 38,784.00
TERMS	
To be determined. All prices are U.S. dollars.	
All prices are firm for 60 days from the date of this quotation. Prices may or may not change due to anticipated steel price increases from our steel suppliers. Please call for update prior to an order.	
Please note that prices do not include freight and installation labor.	
- THANK YOU FOR THIS OPPORTUNITY TO BE OF SERVICE. -	

- - GENERAL TERMS AND CONDITIONS - -
PRICES: The above prices are firm for a period of thirty days from the date of quotation, but are subject to change, without notice, after that time. **SALES TAX:** This proposal does not include any sales, use or occupational tax that may be imposed by competent taxing authorities at any time, present or future. Payment of such tax is to be the responsibility of the purchaser unless specific provisions are made by the seller. **ERRORS:** Typographical and stenographic errors subject to correction. **DELAYS:** All quotations and agreements are contingent upon strikes, accidents, fires, availability of materials and all other causes beyond our control.

Mike Ramczyk

SIGNED Mike Ramczyk

ABEL MANUFACTURING CO., INC.

ABEL BIN PLANNING SHEET

REPRESENTATIVE
PIVOTAL PLUS CONSULTING LTD.
14 HARWICK LANE
WINNIPEG, MANITOBA R2J 3H1
CONTACT HEATHER GREGORY
PHONE (204) 771-7454
FAX (204) 257-7475

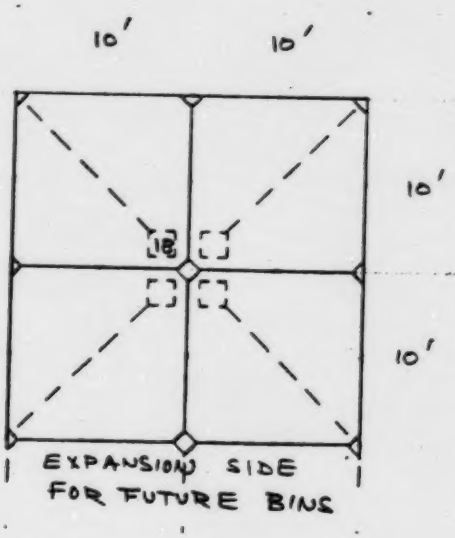
PROSPECT
SASKATCHEWAN
CONTACT
PHONE
FAX

DATE 2/27/9
PREPARED BY MGR
QUOTE REQUIRED BY

BIN TYPE:
STANDARD ✓
CORRUGATED
OTHER

NMBR OF BINS	BIN SIZE	SIDE WALL HT	BUSHELS ~~CU-FT~~/BIN	LBS/CU-FT	TONS/BIN	NOTES
4	10' x 10'	49'-11"	4025	40	99.8	

STRUCTURAL STEEL:
OVERALL HEIGHT 30'-0" (OR 19'-0")
HOPPER CLEARANCE 14'-2" TO GATH. HOP. (OR 3'-2")
WEIGH HOPPER ELEV
MEZZANINE ELEV
SEISMIC ZONE II
WIND LOADING 90



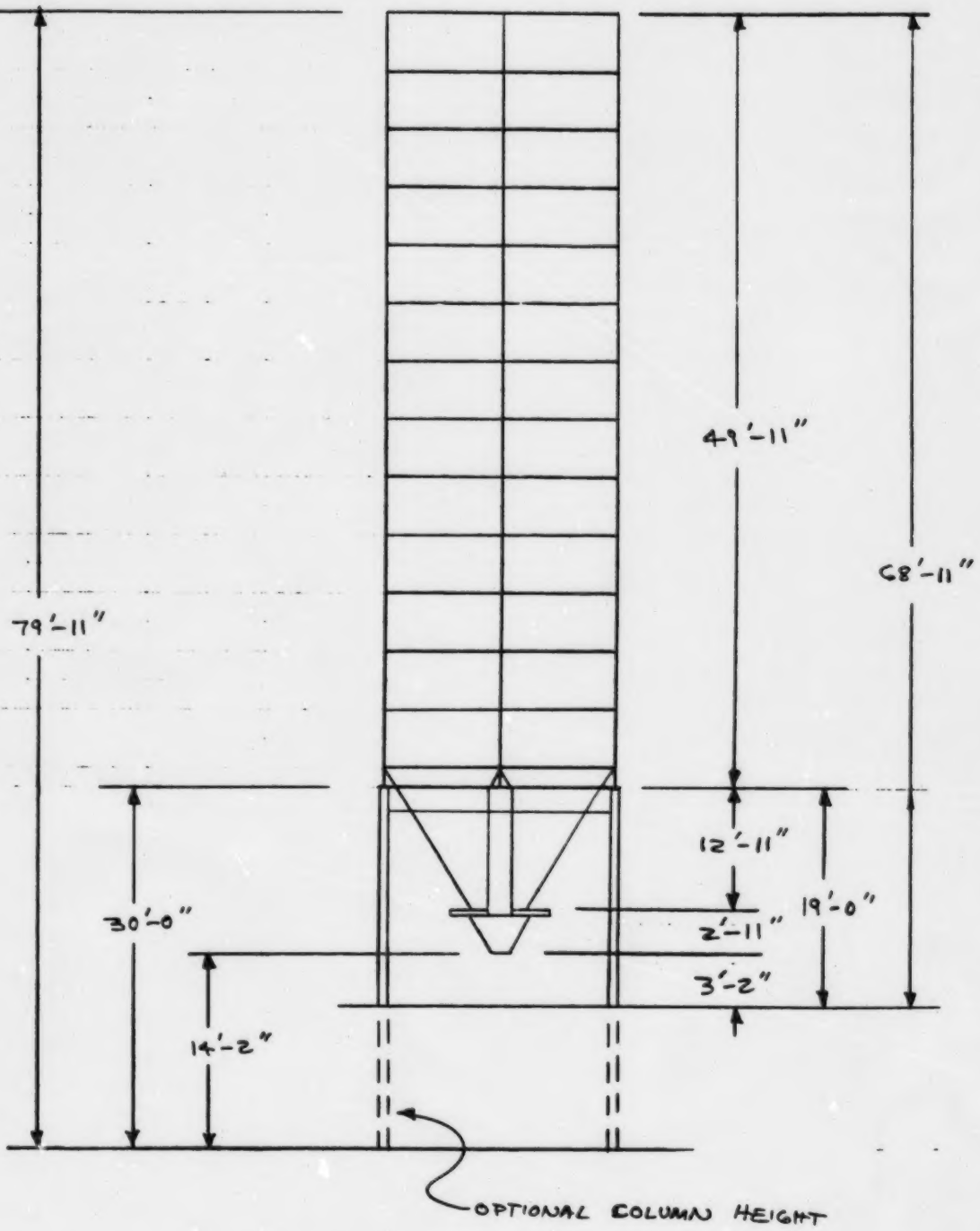
BIN OPTIONS:
45° CORNERS ✓
EXT BAFFLES
ROOF TYPE
GALVANIZED
PAINT TYPE
PANELING

BIN ACCESSORIES:
RAILING ✓
FLASHING ✓
LADDER ✓
SAFETY CAGE ✓
REST PLATFORM ✓

GATES:

QUAN	SIZE	TYPE
(4)	18"	R&P W/H. OR CH.W.
(1)	18"	4-TO-1 GATHER, HOP.

BATCHING SYSTEM:
WEIGH HOPPER
FLARE TOP
COVER
LEVERS/CELLS
WEIGHT DISPLAY


79'-11"
49'-11"
68'-11"
30'-0"
14'-2"
12'-11"
2'-11"
3'-2"
19'-0"
OPTIONAL COLUMN HEIGHT

Appendix III

CWB

FARMER OWNED STORAGE

Basic Facilities:

1. A farmer owned storage facility must be licensed as a Primary Elevator on a rail line.

   (a) The facility must have suitable and ready access to equipment to maintain the quality of the grain during storage for the farmer *(Warehousability)*.

   (b) The facility must be covered by insurance to protect the farmer from loss of grain due to fire *(Insurability)*.

2. The principle of farmer owned storage facility is to add licensed capacity to the primary elevator system while maintaining existing public access to primary elevator storage (Includes new construction and facilities not previously licensed as primary elevators).

Definition of Farmer Ownership:

1. True condominium storage, whereby farmers own space in a facility licensed as a primary elevator and hold actual title to such space; and

2. Storage leased under a proprietary lease agreement with a company owning and managing a licensed primary elevator. A proprietary lease is evidenced by characteristics akin to ownership including:

   (a) term of the lease is indefinite

   (b) the lease is purchased for an up-front cost; there is no annual rent

   (c) the lease is fully transferable.

Conditions:

1. The CWB will approve farmer owned storage facilities on a case by case basis.

2. Conditions - Elevator Company's Perspective:

   (a) Any agreement for a proprietary lease or sale of farmer owned storage units will be executed on fully commercial terms.

   (b) The handling company will be permitted to use unleased units owned by them, or may lease or sub-lease farmer owned storage space for the storage of grain as part of its primary elevator operations subject to compliance with all applicable legal requirements.

   (c) Grain delivered into farmer owned storage facilities may be commingled with other grain in the primary elevator to facilitate handling.

(d) At the time of delivery of grain into farmer owned storage facilities, a detailed record, by load, must either be entered into the farmer's permit book or a record otherwise maintained by the elevator company for inspection purposes.

(e) The requirement that off-Board feed grain must be for immediate sale will be waived in respect to grain delivered into farmer owned storage facilities.

3. Conditions - Farmer's Perspective.

(a) Grain delivered into farmer owned storage facilities is not subject to delivery levels or calls.

(b) The quantity of grain delivered must not exceed the space owned or leased by the farmer.

(c) Farmers who own storage units may lease or sub-lease their interest in a storage unit to any person entitled to deliver grain to a primary elevator for the storage of grain that is not subject to delivery levels or calls.

(d) Farmers who own storage units may lease or sub-lease their interest to the handling company for use by them as part of, and subject to the same requirements as, its primary elevator operations.

(e) The requirement that off-Board feed grain must be for immediate sale will be waived in respect to grain delivered into farmer owned storage facilities.

Reference: Country Services Division, Research & Planning
February 1995
cs\crj\condo\criteria.doc

Farmer Owned Storage Projects - Status to Date:

Location	Company	CWB Approved in Principle	Construction	Expected Completion Date	CWB Handling Agree. Extended
Weyburn, Sk	Weyburn Inland Terminal (Condo I)		completed		Sept 3/92
Weyburn, Sk	Weyburn Inland Terminal (Condo II)	Dec 23/93	in progress	Fall '94	
Unity, Sk	Saskatchewan Wheat Pool	June 4/93	in progress	Fall '94	
Rivers, Mb.	Cargill Ltd/Riverdale Grain Ltd	Sept 1/93	suspended		
Herschell, Sk Langenburg, Sk Morinville, Ab	United Grain Growers Ltd (proprietary lease)	Oct 14/93	completed		Sept 3/92 (not yet returned)
undetermined	Pioneer Grain Co. Ltd. (rental)	June 16/94	to be determined		
Indian Head, Sk	N. M. Paterson & Sons Ltd	June 17/94	in progress	Fall '94	
Smoky River, Ab Legacy Junction, Ab	Alberta Wheat Pool	in progress			
Hamlin, Sk	Parrish & Heimbecker Ltd	Nov 29/94			
Wadena, Sk	North East Terminal Ltd	Sept 2/94	Sept '94		Nov 1/94
Davidson, Sk	United Grain Growers	Jan 23/95	proposed		

1993-94 Memorandum Of Agreement

Primary Elevator

Memorandum of Agreement made in duplicate this day of A.D. 1993

Between

SPECIMEN COPY

(hereinafter called the Company)
OF THE FIRST PART.

- And -

THE CANADIAN WHEAT BOARD

(hereinafter called the Board)
OF THE SECOND PART

WHEREAS the Board is incorporated under the Canadian Wheat Board Act with the object of marketing in an orderly manner in interprovincial and export trade grain grown in Canada and pursuant to said object receives grain from producers and markets the same;

AND WHEREAS to accomplish the said object it is convenient and desirable that the Board employ the services of persons and corporations owning and operating primary elevators;

AND WHEREAS this Agreement is made with the object of facilitating delivery to the Board of wheat and barley of producers and the marketing thereof and otherwise carrying out the provisions of the said Act;

AND WHEREAS the Company has agreed with the Board that it will act as an agent of the Board to accept deliveries and to carry out the purchase of wheat and barley;

NOW THIS AGREEMENT WITNESSETH that in consideration of the mutual covenants and agreements hereinafter contained, the parties hereto mutually covenant and agree each with the other as follows:

PURCHASE OF GRAIN

Interpretation 1 Unless it is otherwise provided herein or the context otherwise requires, the words and expressions used in this Agreement shall be given the same meaning as is accorded to such words and expressions when used in the Canadian Wheat Board Act.

Definitions 2 In this Agreement, unless the context otherwise requires,

"Act" (a) "Act" means the Canadian Wheat Board Act and amendments thereto.

"Bank" (b) "Bank" means a bank to which the Bank Act applies or a credit union, caisse populaire or other co-operative credit society that is designated by the Minister on application of that society as a bank for the purposes of the Act.

Class "A" grain (c) Class "A" wheat and barley means respectively wheat and barley shipped for the account of the producer (generally termed consigned or producer shipments).

Class "B" grain (d) Class "B" wheat and barley means respectively wheat and barley purchased for the Board at a primary elevator and includes all wheat and barley in store for the Board in primary elevators on the 1st day of August, 1993.

"crop year" (e) "crop year" means the period commencing on the 1st day of August, 1993, and ending on the 31st day of July, 1994.

"CWB Initial payment" (f) "CWB initial payment" means the fixed price per tonne in store Thunder Bay or Vancouver less the lesser of the statutory freight charges from the point at which the grain was delivered by the producer to Thunder Bay or Vancouver.

"Deferred Cash Purchase Ticket"

(g) "Deferred Cash Purchase Ticket" means a cash purchase ticket issued by the Company in accordance with Section 76 (1) of the Income Tax Act (Canada) to a producer in payment for wheat or barley purchased for the Board.

"Elevator Receipt"

(h) "Elevator Receipt" means a document in prescribed form, or electronic representation of same, issued in respect of grain delivered to an elevator acknowledging receipt of the grain and, subject to any conditions contained thereon or in the Canada Grain Act, entitling the holder of the document

(i) to the delivery of grain of the same kind, grade and quantity as the grain referred to in the document, or

(ii) in the case of a document issued for specially binned grain, to the delivery of the identical grain.

"electronic transmission"

(i) "Electronic Transmission" means transmission to the Board of data required to be transmitted to the Board pursuant to this Agreement by a computer system maintained by the Company.

"feed grain"

(j) "feed grain" means

(i) in respect of wheat, wheat of the grade No. 3 Canada Western Red Spring or wheat of any equivalent or lower level of excellence,

(ii) in respect of barley, barley of the grade Extra No. 1 Canada Western or barley of any lower level of excellence.

"fixed price"

(k) "fixed price" means the sum certain on a per tonne basis referred to in Section 32 (1) (b) and (c) of the Act.

"producer's certificate"

(l) "producer's certificate" means a certificate authorized by Section 32 (1) (d) of the Act.

"terminal point" "terminal points"

(m) "terminal point" or "terminal points" means and includes terminal elevators at Thunder Bay, Churchill, Prince Rupert, Vancouver and interior terminal elevators, malting plants and mills (process elevators) at which Canadian Government weights and grades are available in the Western Division.

Company to be agent of Board

3 The Company will, as agent of the Board, from the 1st day of August, 1993, during the term of this Agreement at any primary elevator owned or controlled by it in the designated area subject to the Canada Grain Act and subject to space being available therein:

To accept delivery of and purchase grain

(a) accept delivery of wheat and barley for and purchase the same on behalf of the Board from any producer on the terms and conditions herein contained and in accordance with the terms of the Act and the regulations made thereunder.

To store grain

(b) store such wheat and barley purchased for the Board in premises licensed by the Canadian Grain Commission, and

To ship grain

(c) subject only to the availability of railway cars in which to make shipment from a primary elevator or annex, whether connected by auger or not, deliver such wheat and barley purchased for the Board to the Board at terminal points or other destinations, all as instructed by the Board.

Company to purchase exclusively for Board

4 (a) The Company will, subject to the Canada Grain Act, and as agent of the Board, during the term of this Agreement, purchase and handle exclusively for the Board wheat and barley which have a level of excellence higher than that of feed grain. Except with the permission of the Board, the Company will not buy or sell wheat or barley having a level of excellence higher than that of feed grain either for its account or for the account of any person except the Board, and in handling wheat and barley purchased for the Board will use its own credit and monies and paying arrangements to the end that advances and payments may be made promptly to producers at the point of delivery.

(b) In handling selected barley, the Company will, purchase exclusively for the Board from only those producers who have a selected barley permit or a malting barley storage and delivery contract with the Board and with respect thereto will:

Payment to producers during crop year

(i) during each crop year grade the selected barley received and pay the appropriate CWB initial payment published by the Board for that crop year by issuing a cash purchase ticket for such initial payment less authorized deductions and tariff charges plus payment on behalf of the Board of carrying charges for storage from the effective date of any malting barley storage and delivery contract entered into by the Board to the date of the producer's delivery of the barley to the Company (Selecting Party), if directed by the Company (Selecting Party), at the rate indicated in any such contract.

Payment to producers after end of crop year

(ii) after the 31st day of July, 1994, until the 1st day of October, 1994, or such earlier date as the Board may prescribe, at the request of the Board receive from producers selected barley into storage and issue appropriate elevator receipts as prescribed under The Canada Grain Act to the producer delivering the same.

Exceptions

(c) Nothing in paragraph 4(a) shall be construed to restrict or apply to:

(i) resales of grain purchased by the Company from the Board.

(iii) trading by the Company on the futures market and cash grain market of the Winnipeg Commodity Exchange or any other grain or commodity exchange.

(iii) dealing in wheat and barley grown outside of the designated area.

(iv) dealing in wheat and barley within the province in the designated area in accordance with provincial legislation relating thereto.

(v) the handling of pedigreed seed in accordance with the Seeds Act.

(vi) dealing in feed grains.

Permission to ship interprovincially

(d) The Board does hereby grant to the Company during the term of this Agreement permission and licence to ship, transport or cause to be transported wheat, barley or products thereof purchased for the Board pursuant to this Agreement from one province to terminal points or to other destinations designated by the Board in another province provided that such grain is consigned to an agent of the Board.

CLASS "A" GRAIN

Service to producers

5. The Company will facilitate the loading of Class "A" wheat and barley offered for sale to the Board by producers for shipment to the Board at terminal points or other destinations.

CLASS "B" GRAIN

Purchase of grain from producers

6 The Company will, subject to the Canada Grain Act and as agent of the Board during the term of this Agreement, purchase or receive into storage Class "B" wheat and barley for the Board as offered by producers at primary elevators in the designated area and with respect thereto will:

Payment to producers during crop year

(a) (i) during each crop year grade the grain received and pay the appropriate CWB initial payment published by the Board for that crop year by issuing a cash purchase ticket for such initial payment less authorized deductions and tariff charges.

Payment to producers after end of crop year

(ii) after the 31st day of July, 1994, until the 1st day of October, 1994, or such earlier date as the Board may prescribe, at the request of the Board receive from producers wheat or barley into storage and issue appropriate elevator receipts as prescribed under the Canada Grain Act to the producer delivering the same.

Issue producer's certificate

(b) deliver a purchase certificate to the producer at the time of purchase.

Storage of grain

(c) carry and store such wheat and barley from the date of purchase at the rates and under the conditions herein provided, in premises licensed by the Canadian Grain Commission until it is delivered to the Board.

Publication of CWB initial payments

7 The Board will, on or before the 1st day of October, 1993, prepare and forward to the Company a schedule of CWB initial payments for the purchase of wheat and barley for the Board from producers and as initial payments for additional grades are fixed from time to time the Board will give notice in writing thereof to the Company. If wheat or barley of a grade not set out in the notices given from time to time as aforesaid is offered by a producer to the Company for sale to the Board, the Board will, upon application by the Company, establish a CWB initial payment therefor.

Delivery by Company to terminals at Company's risk

8. (a) The Company will deliver to the Board at terminal points, or process elevators or other destinations designated by the Board, the full amount of tonnes of Class "B" wheat and barley purchased for the Board and received from producers pursuant to this Agreement and is responsible for and assumes the risk of grade on such wheat and barley and will deliver to the Board at terminal points wheat and barley equal to the quantities received as aforesaid, subject only to sub-paragraph (b) and paragraph 11 hereof.

Saving clause

(b) The Company will ship from each primary elevator and deliver to the Board as nearly as possible the same quantities and grades of Class "B" wheat and barley purchased for the Board as were received from producers at such primary elevator.

ALL GRAINS

Returns to Board

9. The Company will, until the 1st day of October, 1994, provide the Board with:

Daily report of receipts

(a) a daily report of the grade and quantity of Class "B" wheat and barley received at each of its primary elevators for the Board as soon as such information is available at the head office of the Company.

Report of shipments

(b) as soon as possible after shipment, a list showing the railway cars of wheat and barley shipped and the destination of each such railway car.

Insurance

10. (a) The Company will insure against fire and keep insured against fire at its own expense all Board wheat and barley in its primary elevators on the basis of values to be fixed by the Board from time to time, and will promptly report to the Board fire losses in the Company's primary elevators.

Railway wrecks

(b) When loss or damage occurs to wheat or barley of the Board as a result of the railway cars containing the same being involved in a wreck (in which event no elevator receipt will be available) the Board agrees to sell such wheat or barley to the railway company. The Company will report promptly such loss or damage and subject to paragraph 11 will handle the claim and attend to all transactions with the railway company in the usual manner.

Company's risk

11. (a) All wheat and/or barley whether Class "A" or Class "B" delivered to the Company for the account of the Board shall be at the Company's risk until terminal or process elevator receipts therefor are delivered to the Board, or settlement is made to the Board for such grain provided that the Company shall not be liable for:

Exceptions

(i) loss or damage to the said wheat or barley which is caused solely by cyclone, tornado, flood, riot, civil commotion, acts of God or the Queen's enemies, if any damage occasioned to premises in which such wheat or barley is stored by such cyclone, tornado, flood, riot, civil commotion or acts of God or the Queen's enemies is repaired with reasonable diligence; or

(ii) loss or damage to said wheat or barley (except losses from leaking railway cars) which occur from causes beyond the control of the Company, without negligence on the part of the Company while such wheat or barley is in the custody of a common carrier and for which loss or damage there is no liability upon such carrier; and in such cases the Board will pay to the Company the net amount of such loss or damage.

Loss when in custody of common carrier

(b) If loss or damage occurs to wheat or barley purchased by the Company pursuant to this Agreement while in the custody of a common carrier and the carrier disclaims liability to the Company, and

(i) the Company claims it is not liable to the Board for such loss or damage pursuant to sub paragraph (a) (ii) of this paragraph, or

(ii) the Company considers that issues of general importance are involved in the claim, and the Board agrees, then the Company shall:

(I) maintain its claim against such carrier and cooperate with the Board in respect of the collection of its claim; and

(II) forward to the Board the written opinion of its solicitors relating to such claim, including all documents, reports or judgments relating thereto, and appropriate authority authorizing the Board to prosecute or continue an action against such carrier to enforce such claim in the name of the Company or the Board, and then the Board may bring action against the carrier to enforce such claims either in the name of the Board or the Company, and will indemnify the Company against payment of costs, expenses or loss incurred in such action.

Epidemic clause

(c) Notwithstanding the provisions of paragraph (a) hereof, and without affecting any rights which the Company may otherwise have, if loss or damage is sustained by the Company in relating to wheat or barley purchased for the Board from extraordinary and epidemic causes or conditions which, in the opinion of the Board, were completely beyond the control of the Company and did not result from negligence of the Company, the Company may apply to the Board for compensation for such loss and the Board may in its discretion award the Company such compensation as the Board deems proper.

Payment by Board of fixed price to Company

12. (a) The Board will pay the Company on date of invoice therefor, the fixed price on a Thunder Bay or Vancouver basis in respect to wheat and barley for wheat and barley delivered by the Company to the Board at terminal points or other points after receipt by the Board of unload documents relating to such wheat or barley subject to the provisions contained in paragraphs 13, 14, 15 and 21 of this Agreement.

Payment by Board of carrying charges to Company

(b) During the crop year the Board will pay to the Company storage and interest in relation to each tonne of Class "B" wheat and barley purchased pursuant to the Agreement during the crop year or purchased by the Company during previous crop years for the Board and in primary elevators of the Company at the commencement of the crop year, such carrying charge as is in Schedule A set forth for that (those) crop year(s).

Payment of carrying charges after end of crop year

(c) On and after the 1st day of August, 1994, and until the 1st day of October, 1994, the Board will pay to the Company in relation to Class "B" wheat and barley purchased by the Company for the Board and in store primary elevators of the Company on the said 1st day of August or purchased pursuant to this Agreement on or after said date, such carrying charges as may be provided in relation to similar grain by the Agreements between the Board and grain handling companies relating to the handling of grain for the Board in respect of the crop year which commences on the said 1st day of August.

Diversion

13. (a) The Company will ship or divert, without cost to the Board, wheat or barley purchased for the Board at primary elevators or owned by the Board to such terminal points or other destinations within Canada or the United States of America as the Board may direct.

Canadian Government weights to be used - exception

(b) Unless otherwise provided for, in the case of wheat and barley being shipped to a destination where Canadian Government weights are not applicable, the shipping weights shall be final and an affidavit of such shipping weights shall be furnished upon request.

Freight rates

14 (a) If the Board requires shipment to be made to a terminal point or elsewhere where the freight rate is greater than the rate included in the computation of the CWB initial payment the Board will reimburse the Company for any difference in freight rates. In the event of the freight rate being less than the rate included in the computation of the CWB initial payment the Company will reimburse the Board for any difference, basis gross weights in each case.

Changes to freight rates

(b) If, during the currency of this Agreement, the basic freight rate applicable to wheat or barley in the designated area is varied, then it is understood and agreed that the CWB initial payment referred to herein will be changed accordingly on and after the effective date of the variation in the said rate and

Increase of freight rates

(i) in the event of an increase in the basic freight rate aforesaid, the Board will reimburse the Company for the difference in freight rates in respect of wheat and barley purchased for the Board and in store primary elevators on the effective date of the variation in the said rate; or

Decrease of freight rates

(ii) in the event of a decrease in the said basic freight rate, the Company will pay to the Board an amount equal to the reduction in the freight rate per tonne in respect of each tonne of wheat or barley purchased for the Board and in store primary elevators on the effective date of the variation in the said rate.

Change of fixed price

15. If, on or before the 1st day of October, 1994, the fixed price or the spreads between grades are changed by amendment of Order in Council the Board will accept delivery from the Company of all wheat and barley received by the Company at the fixed price and spreads on which the Company has based its purchase of the same.

Bank loans

16. In order to facilitate immediate payment or advance to producers in respect of their wheat and barley delivered to and received by the Company and designated for the Board, the Company may borrow from its bank on the security of all wheat and barley whether of Class "A" or Class "B" so received by the Company and may give security on such wheat, and barley in accordance with the bank's usual requirements, such security in respect of such wheat and barley to be effective only to the extent of the advances actually made in respect of such wheat and barley not exceeding the Board prices therefor as fixed by or under the Act, and subject to paragraph 7 hereof, plus transportation charges actually paid out and other charges and allowances authorized by the Board; and the Company shall be and is deemed and declared to be the owner of such wheat and barley for all such purposes and to such extent, and in the case of default by the Company the bank shall sell or dispose of such wheat and barley to the Board only, and the Board agrees to take delivery on the terms of this Agreement from the bank in lieu of the Company and to pay to the bank the Board's fixed carlot prices for such classes and grades of wheat and barley delivered at Thunder Bay or Vancouver or such other delivery point as may be authorized by the Board, plus charges and allowances authorized by the Board, and the security shall thereupon cease and the Board shall have clear title to such wheat and barley. Such payment shall be a complete fulfillment of the Board's obligations to the Company in respect thereof as if such payment were made to the Company.

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Company to keep records and make returns

17. (a) The Company shall keep or cause to be kept such records and shall make or cause to be made such returns from time to time as may be directed or required by the Board pertaining to wheat and barley for the purpose of determining the proper carrying out of the terms of this Agreement. In addition, for data transmitted electronically, the Company shall retain the Company's copies of producer's certificates relevant to purchases for the Board's account, for a period of not less than seven (7) years from the date of termination of this Agreement and shall provide a true copy of any such document, verified by such certificate or affidavit as the Board may require, to the Board upon request. All such records and returns shall accurately and faithfully represent the facts of the transactions to which they respectively purport to relate, and shall be subject at any time to examination by any authorized officer, agent or employee of the Board.

Parties to comply with rules in Schedules B, C and D

(b) Without restricting the foregoing, the parties hereto shall comply with the RULES IN RESPECT OF REPORTING RECEIPTS, DELIVERIES AND COLLECTION OF CARRYING CHARGES set forth in Schedule B, and RULES IN RESPECT OF REPORTING RECEIPTS AND DELIVERIES FOR DESIGNATED BARLEY set forth in Schedule C and RULES IN RESPECT OF REPORTING RECEIPTS TO THE BOARD VIA ELECTRONIC TRANSMISSION set forth in Schedule D hereof.

Company to post Board notices

18. The Company will post and keep posted in prominent places in its primary elevators, in order that they may be readily read by all persons concerned, such notices as the Board may require to facilitate the handling of Board wheat and barley in such primary elevators and such notices as may be supplied by the Board for the purpose of notifying producers of delivery opportunities in existence from time to time at the delivery point at which a primary elevator of the Company is situated.

Supply of information by the Board

19. Any information supplied by the Board to the company which discloses personal information pertinent to producers shall be treated as confidential information and used by the company solely for the purpose for which it was supplied as agreed upon by the Board and the Company.

Board to supply stationery

20. The Board will supply all special stationery and forms not usually used in the Company's business but necessary for use by the Company in carrying out this Agreement.

Elevator closing

21. If the interests of the Company so require, upon two (2) weeks notice in writing to the Board the Company may close any of its said primary elevators and paragraph (a) of paragraph 3 of this Agreement shall not apply to such primary elevator after the giving of such notice and during the period the primary elevator remains closed, but the other provisions of this Agreement shall apply until all stocks of Board wheat and barley in the primary elevator have been shipped.

Liquidated damages for failure to ship

22. As part of the Company's remuneration for carrying wheat and barley in its primary elevators until transportation is available unless otherwise agreed, and as it is difficult to estimate the damage caused by the Company's default if the Company does not ship Class "B" wheat and barley in accordance with conditions set out in this Agreement, the Company shall not be entitled to payment of carrying charges accrued or accruing and unpaid on any Class "B" wheat and barley the Company may then have in a primary elevator from which the Company has failed to make shipment in accordance with the terms of this Agreement. This provision is in the nature of liquidated damages and not a penalty but shall not be construed to prevent the Board from obtaining an injunction or any other appropriate remedy in the event of the Company's refusal or neglect to ship wheat or barley in accordance with the terms of this Agreement.

23. In paragraphs 24 and 25

(a) "carrying charge value" means the value per tonne established by the Board from time to time for each kind of grain at the point at which the grain is delivered for the computation of provisional carrying charges to be paid by the Board to the Company in respect of a tonne of that grain;

(b) "deferred cash purchase ticket" means a cash purchase ticket issued by the Company in accordance with Section 76 (4) of the Income Tax Act (Canada) in payment for wheat or barley purchased for the Board to a producer.

Deferred Cash Purchase Tickets, Reports and Payments

24. The Company agrees that:

(a) all reports covering purchases of grain for the Board on a deferred cash purchase settlement with producers as outlined in paragraph 2 of Schedule B hereof RE: PURCHASE REPORTING, shall be submitted by the Company to the Board on a daily basis prior to twelve (12:00) o'clock noon Winnipeg time on each reporting day;

(b) each day with the relevant reports it will remit to the Board by certified cheque or telegraphic transfer payable to the said Board at Winnipeg, in an amount equal to the carrying charge values established by the Board for that day for wheat and barley respectively multiplied by the number of tonnes of each grain purchased by the Company for the Board and reported on that day.

25. The Board and the Company agree that

(a) the money received and held by the Board pursuant to paragraph 24 (hereinafter referred to as the Trust Money) is received and held by the Board in trust only for the holders of deferred cash purchase tickets issued by the Company;

(b) the Company will, as agent of the Board, out of its own funds, pay to the holder of each deferred cash purchase ticket on presentation of the ticket duly endorsed after due date, the monies payable to the holder as referred to in the cash purchase ticket.

26. The Board will, on demand, reimburse the Company from the trust money for payments made to holders of deferred cash purchase tickets pursuant to the preceding paragraph as follows:

(a) During the month of January, 1994, the Board will, on any business day of the week, after receiving, prior to eleven (11:00) a.m. Winnipeg time, supporting bank documentation or a certificate of the chief financial officer of the Company or in his absence an officer of the Company authorized to sign for the Company under its banking by laws setting forth the amount of cash purchase tickets cashed by the Company prior to the date of payment and in respect of which the Company has not received payment pursuant to this paragraph, pay to the Company eighty-five percent (85%) of that amount, provided that the aggregate of payments made to the Company pursuant to this sub paragraph does not exceed ninety-five percent (95%) of the trust money due in January, 1994, held by the Board plus interest at bank rate from the date of cashing to the date on which payment is being made.

(b) On the 31st day of January, 1994, the Board will, on demand and after receiving a report from the Company of the amount of cash purchase tickets paid by the Company in January, 1994, pay to the Company any remaining trust money held by the Board to the extent that such payment plus payments made by the Board pursuant to the preceding sub-paragraph in aggregate do not exceed ninety-five percent (95%) of the trust money due in January, 1994, deposited by the Company with the Board.

(c) Not later than March 31, 1994, the Company shall advise the Board of the actual amount of deferred cash purchase tickets covering purchases of grain for Board account paid by the Company each day during January, 1994.

In the event that the Company cannot determine the exact amount of deferred cash purchase tickets covering purchases of Board grain paid by the Company each day during January, 1994, the Company shall report to the Board under certificate of the chief financial officer of the Company, the percentage of the value of deferred cash purchase tickets covering purchases of grain for Board account paid by the Company during January, 1994, in relation to total value of Company cashing of deferred cash purchase tickets during that month. This percentage will be used by the Board to determine the actual value of daily cashings of deferred cash purchase tickets for Board account.

Upon receipt of this report in good order, the Board shall remit to the Company the remaining balance of trust money held by the Board together with interest at bank rate from the date that these funds would have otherwise been paid to the Company pursuant to sub-paragraph (a) or (b) to either the date payment is made or March 31, 1994, whichever is earlier.

The Board will compare the actual or estimated actual values of deferred cash purchase tickets covering purchases of Board grains paid by the Company each day during January, 1994, with amounts paid to the Company pursuant to paragraph 25 (a) above.

Where actual or estimated daily cashings, during January, 1994, differ from the basis of settlement set out in paragraph 25 (a), an interest adjustment will be determined by the Board and settlement made between the Board and the Company on the basis of that determination. Interest will be calculated at the Canadian Chartered Banks' Prime Rate in effect from time to time less one half of one percent for the period beginning January 1, 1994, to date settlement is effected.

The determinations of the Board pursuant to this paragraph shall be final and binding on the parties.

(d) In each month in the crop year, other than January, 1994, the Board will pay to the Company on the 7th day of that month, without interest, a sum equal to the deferred cash purchase tickets issued by the Company and falling due for payment in that month.

(e) After the end of each calendar year the Board will pay to the Company a sum equal to the amount by which the monies paid to the Board by the Company in the last preceding calendar year, without interest, exceed the aggregate of the payments made to the Company by the Board in respect of deferred cash purchase tickets falling due within the calendar year.

(f) Nothing in this paragraph shall be construed to require the Board to pay to the Company in respect of deferred cash purchase tickets falling due for payment in the calendar year any sum in excess of the monies received by the Board from the Company in the last preceding calendar year in respect of deferred cash purchase tickets.

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GENERAL.

Board's powers under the Act not impaired

27. It is understood and agreed by all parties hereto that nothing in this Agreement contained shall be deemed to be a waiver, modification or abandonment of any powers granted to the Board by the Act.

Termination

28. (a) Subject to sub paragraph (b), if the parties hereto fail to agree, before the 1st day of October, 1994, upon the terms of an Agreement for the new crop year which will commence on the 1st day of August, 1994, then on the said 1st day of October the agency of the Company shall terminate and come to an end.

(b) It is further understood and agreed that this Agreement shall continue in full force and effect in respect to all Class "II" wheat and barley purchased by the Company for the Board pursuant to this Agreement until such wheat and barley have been delivered to the Board and all Class "A" grain shipped by the Company has been delivered to the Board.

29. In the event that legislation enacted by Parliament or a regulation made thereunder, in the opinion of the Board or the Company adversely affects its rights or operations under this Agreement, the Board or the Company may, within sixty (60) days thereafter, by notice to the other, delivered by registered mail or telex, terminate this Agreement; and upon the expiry of thirty (30) days from the giving of the notice this Agreement shall be at an end.

30. This Agreement shall enure to the benefit of and be binding upon the parties hereto, their successors and assigns respectively.

IN WITNESS WHEREOF the parties have hereunto affixed their corporate seals duly attested by their proper officers in that behalf at the City of , in , the day and year first above written.

Per .....

Per .....

SEAL

FOR COMPANY

SPECIMEN COPY

Per .....

Per .....

SEAL

FOR THE CANADIAN WHEAT BOARD

SCHEDULE A

[PARAGRAPH 12 (b)]

1. Freight Charges

For wheat and barley - the Vancouver or Thunder Bay rate, whichever is the most advantageous to the producer

2. (1) Carrying Charges shall be the total of

(a) for storage: the storage rate per tonne per day for storage in accordance with the applicable tariff from the charges commencement date until the grain is delivered out of the primary elevator in which it is stored, plus

(b) for interest an amount equal to interest at bank rate on the average per tonne cost of the grain concerned from the charges commencement date until the delivery to the Board of documents of title relating to said grain, plus interest on monies borrowed by the Company from a bank for the purpose of buying such grain at a rate equal to the difference between the bank rate and the rate charged on that money.

(c) an amount equal to storage computed in accordance with the applicable tariff, plus interest at the bank rate on the average per tonne cost for the period, both computed to the date of the receipt by the Board of a report of the receipt of the grain from the later of

(a) the date of receipt of the said grain into a primary elevator, or

(b) a date four (4) calendar days earlier than the receipt by the Board of a report of the receipt of the grain as aforesaid.

(2) In the event that the Board is unable to receive an electronic transmission for any reason, the Company will be accredited a carrying charge date on the basis of the date the Company could normally have transmitted.

(3) The carrying charges accruing and due the Company will be paid as at the last day of each month on the 7th working day of the following month except in such cases where due to systems failure or otherwise it is impossible to make payment on this day or where the Board has determined it is impractical to do so. When such exceptions occur, payment will be made on the earliest possible working day thereafter.

(4) Where the Board has requested that certain stocks of grain, purchased pursuant to this Agreement, be reported to the Board as shippable stock or where the Board has requested that stocks of grain, whether reported as shippable stock or not, be delivered by the company to the Board at a terminal or other point in accordance with this agreement, and the company has failed to report within a specified time period or has failed to deliver such grain to the Board as requested within thirty (30) days of the date of such request, then no carrying charges shall be paid by the Board to the Company, pursuant to this Agreement, in respect of such grain for the period (1) following the date specified in the request to report stocks as shippable or (2) following the thirty (30) day period within which the Board had requested the company deliver such grain to the Board as the case may be and extending to the date on which the stocks are reported as shippable stock or delivered to the Board as the case may be. Where a Company is unable to comply with a request made by the Board pursuant to this sub paragraph, due to circumstances completely beyond the control of the Company, then the thirty (30) day period shall be extended by a period equal to the duration of the period of the existence of the circumstances.

SF

3. In this Schedule and in Schedule B

(1) "applicable tariff" means the storage rate charged by the Company in accordance with the schedule of charges filed by the Company with and approved by the Canadian Grain Commission for the storage of wheat or barley by the Company at the primary elevator at which the grain is in store;

(2) "average per tonne cost" means an amount equal to the total of the monies paid by the Company to producers for the purchase of all wheat or barley as the case may be at CWB initial payments published by the Board less primary elevator tariffs as approved by the Canadian Grain Commission for wheat or barley purchased by the Company pursuant to this Agreement divided by the number of tonnes of that kind of grain so purchased;

(3) "bank rate" means the rate of interest charged from time to time by the Canadian Schedule "A" chartered banks as their prime rate on ordinary commercial loans less one-half of one percent.

(4) "charges commencement date" means the first day of the crop year in respect of wheat and barley in store primary elevators of the Company on that date and means in respect of wheat and barley purchased pursuant to this Agreement, the date of mailing, or delivering to the Board the regular daily report form reporting the purchase of such grain at a primary elevator.

SCHEDULE B

[PARAGRAPHS 17 (b), 23 (a)]

RULES IN RESPECT OF REPORTING RECEIPTS, DELIVERIES AND COLLECTIONS OF CARRYING CHARGES FOR GRAINS PURCHASED FOR THE BOARD

Monthly carrying charge statements are to be prepared by the Board and submitted to the Company together with payment on the 7th working day of the following month except in such cases where due to systems failure or otherwise it is impossible to make payment on this day or where the Board has determined it is impractical to do so. When such exceptions occur, payment will be made on the earliest possible working day thereafter. Carrying charges commence on the date purchase reports, supported by copies of producer's certificates, or data electronically transmitted, are received in the Board office, or in the case of companies submitting reports by mail, from the date such reports are actually mailed.

RE: PURCHASE REPORTING

This paragraph shall apply to purchase reports covering immediate payment settlements as well as purchase reports covering deferred payment settlements.

1. Non electronically reported purchase reports received before ten (10:00) a.m. Winnipeg time will receive the previous day's date for carrying charge purposes. If a Sunday or holiday intervenes, the last working day will be used. If reports are mailed, the postal stamp date will be used.

2. All purchase reports and all data electronically transmitted covering deferred payments must be supported by a certified bank cheque or money order payable at par at Winnipeg, in the name of The Canadian Wheat Board in an amount equal to the value of the total tonnes reported at the prescribed rate for each grain in accordance with Board instructions.

RE: DELIVERY REPORTS

1. CARLOT SHIPMENTS OF CLASS "B" GRAIN EX PRIMARY ELEVATORS

(a) To all terminal points except Churchill

(i) the storage portion of carrying charges shall be allowed the Board on the delivery report from the date the elevator manager completed the loading of the railway car, to date of report.

(ii) terminal storage shall be allowed the Board on the delivery report from date of unload into a Terminal Elevator to date of report, less three (3) days, excluding Saturdays, Sundays and holidays. If, however, the elevator receipt is not delivered within this period, storage shall be allowed the Board from date of unload into a Terminal Elevator to date of delivery report, less three (3) days.

(b) To Churchill

(i) the storage portion of carrying charges shall be allowed the Board on the delivery report from the date the elevator manager completed the loading of the railway car, to date of report.

(ii) terminal storage will not apply.

(c) To Process Elevators

the storage portion of carrying charges shall be allowed the Board on the delivery report from the date the elevator manager completed the loading of the railway car, to date of report.

2. SHIPMENTS OF CLASS "B" GRAIN EX PRIMARY ELEVATORS TRANSPORTED OTHER THAN BY RAILWAY CAR

The storage portion of carrying charges shall be allowed the Board on delivery reports from the date of the movement of the grain out of the Primary Elevator to the date of the delivery report.

3. CARLOT SHIPMENTS OF GRAIN OTHER THAN CLASS "B" GRAIN

The Board will accept delivery of the grain by receiving terminal elevator receipts delivered to the Board duly endorsed if required with all lawful charges paid to the date of delivery.

4. FIRE LOSSES

The storage portion of carrying charges shall be allowed the Board on the delivery report from the date of official notification of fire to the date of report.

5. WRECKED RAILWAY CARS

The storage portion of carrying charges shall be allowed the Board on the delivery report from the date the elevator manager completes the loading of the railway car to the date of report.

6. GENERAL

When reporting railway cars on Form TM2 (Elevator Car Loading Report) or information regarding the shipment received by the Board electronically, care must be taken that the date of shipment is the date the elevator manager completed the loading of the railway car. The

SCHEDULE C

[PARAGRAPH 17 (b)]

RULES IN RESPECT OF REPORTING RECEIPTS AND DELIVERIES OF DESIGNATED BARLEY TO THE BOARD

All designated barley must be Class "A" barley.

RE: PURCHASE AND DELIVERY REPORTS

1. (a) Purchase reports supported by copies of producer's certificates must be submitted to the Board no earlier than one (1) day prior to and no later than three (3) days after the submission of the relevant delivery reports to the Board for settlement.

(b) Purchase data electronically transmitted relating to designated barley must be transmitted no earlier than one (1) day prior to and no later than three (3) days after the submission of the relevant delivery reports to the Board for settlement.

2. For settlement with producers of designated barley, where minimal differences between special bin storage ticket weight and unload weights occur, a maximum of up to 500 kilograms per selected barley contract may be purchased as designated barley when special bin storage ticket weights exceed unload weight.

3. Barley in excess of the 500 kilograms maximum (No. 2 above) must be purchased from the producer as street barley (Class "B" grain).

Where a deferred settlement to the producer is made, the procedures outlined in paragraph 23 and Schedule "B" of this Memorandum of Agreement will apply, except that the remittance to the Board of said deferred payments is to be made by twelve (12:00) o'clock noon Winnipeg time, of next working day to that of the deferred purchase report or electronically transmitted deferred purchase data.

4. The Company agrees, where a quantity of barley, selected for malting, cannot be delivered to the Board as designated barley through no fault of the producer who delivered the barley to the Company:

(a) to pay the producer the initial payment for the grade of malting barley delivered to the Company and to submit to the Board a consigned designated barley purchase report in the usual manner showing the quantity and grade for which settlement was made to the producer.

(b) in order to complete the original sale to the maltster or selector (Selecting Party), to replace the original barley with a quantity equal to that shown on the purchase report referred to above. Such replacement barley may be provided from stocks already in terminal position and/or from a primary elevator if, on the basis of samples submitted, this is acceptable to the maltster or selector (Selecting Party). For identification purposes, reporting of such barley will be authorized with a special Board shipping order No. 7000.

RE: ADJUSTMENT PROCEDURES

1. In the event the barley unloaded is in excess of special bin storage ticket weights, The Canadian Wheat Board will, to adjust the overage, debit the shipping company for the difference between the designated barley initial payment and the Class "B" barley initial payment. This monetary adjustment will occur at the crop year end.

2. In the event of an accumulation of designated barley unloads that are less than the special bin storage ticket weights, settled for with producers by the shipping company, the Board may, to adjust the shortages, authorize shipment of suitable quality Class "B" barley stocks. For these shipments the Class "B" barley initial payment will be made at unload to the shipping company. At the end of the crop year The Canadian Wheat Board will credit the shipping company for the difference between the designated barley initial payment and the Class "B" barley initial payment.

RE: MALTING BARLEY STORAGE AND DELIVERY CONTRACTS

[THE FOLLOWING SHALL BECOME EFFECTIVE UPON THE ADOPTION BY THE BOARD OF THE MALTING BARLEY STORAGE AND DELIVERY CONTRACTS AND SHALL BE IN ADDITION TO THE ABOVE.]

1. The company will accept producers' samples of barley offered for selection and will provide producers with contract forms on which to provide details of such offers.

2. The company will provide contracts with supporting samples (No. 1 above) to selectors (selecting party) for selection.

3. The company will retain the sample submitted by the producer in support of the contract until time of settlement (No. 7 below) or until requested by the Board. The company shall then forward the sample to the Board, as directed.

4. The company must forward all details of the contract to the Board for acceptance by:

(a) forwarding the contract that has been properly executed by both the producer and the selecting party to the Board; or

(b) forwarding a record of the properly executed contract to the Board in a format authorized by the Board, or

(c) electronically transmitting a record of the properly executed contract to the Board in a format authorized by the Board.

In addition, for subparagraphs (b) and (c) above the company will retain the Board's copy of the properly executed contract for a period of not less than seven (7) years from the date of termination of this Agreement and shall provide such copy to the Board upon request.

SCHEDULE C

[PARAGRAPH 17 (b)] CONTINUED

5 The company will notify producers of the acceptance or rejection of their offer to sell selected malting barley to the Board, if directed by the selector (selecting party), by the date and time specified in each malting barley storage and delivery contract.

6 On delivery by the producer of the selected barley to the company, the company will take and retain a sample of the barley delivered.

7 On unload at the selector's (selecting party's) process or terminal elevator, once the quality has been confirmed, the company will pay the appropriate CWB initial payment to the producer on behalf of the Board for the barley accepted by the selector.

8 The company will pay to the producer on behalf of the Board at time of settlement (No. 7 above), charges on account of storage from and including the effective date of the contract to the date the producer delivers the barley to the primary elevator at a daily rate established by the Board.

9 The Board will, on receipt of a report from the company, pay to the company the amount of charges on account of storage paid by the company to producers (No. 8 above).

10 Once the producer delivers the barley to the company, the company will deliver the barley to the selector (selecting party).

All other instructions as outlined in Schedule "A", Schedule "B", and Schedule "D" of this Memorandum of Agreement, where applicable, will apply.

SCHEDULED

[PARAGRAPHS 17 and 23]

RULES IN RESPECT OF REPORTING RECEIPTS TO THE BOARD VIA ELECTRONIC TRANSMISSION

Unless otherwise authorized by the Canadian Wheat Board, the Company shall

1. Conduct a parallel system, satisfactory to the Board, of reporting producers' deliveries for Board account to the Board via electronic transmission as follows, prior to full implementation and acceptance by the Board

   (a) A minimum of ten percent (10%) of the total number of producer's certificates emanating from the Company are to be transmitted electronically from automated delivery points via the Head Office to the Board for a period of not less than six (6) consecutive weeks, and

   (b) keep records and make returns in compliance with the rules in respect of reporting receipts as set forth in Schedule B of this Agreement, and

   (c) record and report the receipt data required by paragraph 2 hereof in the manner therein prescribed

2. Upon receipt of written approval of the Board, after successful completion of the parallel system of reporting required in paragraph 1 hereof, the Company may discontinue the submission of such documents as the Board may specify in writing relating to electronically transmitted receipts and may employ electronic transmission as the sole method of reporting to the Board as required under this Agreement under the following conditions.

   SPECIMEN COPY

   (a) All elements contained in the producer's certificate must be identical with summary elements to the data to be transmitted to the Board prior to transmission,

   (b) The data contained on the original computer produced producer's certificates as provided to the producer by the Company in respect of a delivery, including adjustments and corrections thereto, must be identical to the data transmitted to the Board.

   (c) All data contained on the producer's certificate to be transmitted to the Board, must be generated at the point of origin of the producer's certificate, except that adjustments and corrections thereto may be generated from the Head Office of the Company;

   (d) The Company must transmit all data contained on the producer's certificate and report elements as may be agreed upon by the Company and the Board from time to time,

   (e) Where deferred settlement to a producer is made, the procedures as outlined in paragraph 23 and Schedule B of this Memorandum of Agreement will apply, except that:

      (i) the data covering these purchases for the Board transmitted electronically by the Company must be submitted to the Board prior to two thirty (2.30) p.m. Winnipeg time on each reporting day;

      (ii) the Company shall remit to the Board no later than twelve (12.00) o'clock noon Winnipeg time on each transmitting day by one (1) certified cheque supported by documentation satisfactory to the Board, detailing the manner in which the cheque should be applied, in respect of wheat and barley purchased by deferred cash ticket, as detailed in paragraph 23 (b) of this Memorandum of Agreement

   (f) The Company agrees that it shall be liable for any damage, loss or expense incurred by The Canadian Wheat Board in respect of any false or erroneous information which has been electronically transmitted to the Board and which has been relied upon by The Canadian Wheat Board for any purpose and shall compensate The Canadian Wheat Board for such damage, loss or expense upon demand

3. Where the Company has been reporting electronically in the manner prescribed by paragraph 2 hereof for a minimum period of six (6) months and is currently reporting a minimum of seventy five percent (75%) of it's total volume of purchases made pursuant to this Agreement to the Board by electronic transmission then the Company may report by electronic transmission such data as is required by the Board pursuant to this Agreement to the Board from manually produced producer's certificates provided that the Company has, in the opinion of the Board, successfully reported, by electronic transmission, such data from manually produced producer's certificates to the Board for a minimum period of two (2) consecutive weeks together with such reports as are required by the rules in respect of reporting receipts set forth in Schedule B of this Agreement

4. Upon receipt of electronically transmitted data from the Company, The Canadian Wheat Board will:

   (a) supply to the Company a computer produced summary of all electronic transactions received subsequent to each transmission by the Company

   (b) allow the Company carrying charges in accordance with paragraph 2 (1) of Schedule "A" hereof.

Canadian Grain Commission | Commission canadienne des grains

Canada

Producer Car Information

Industry Services

Crop Year
1994-1995

SUMMARY OF MAJOR PRODUCER CAR RULES FOR THE 1994-95 CROP YEAR

1. The Canadian Grain Commission will accept producer car applications:
   a) For non-Board grains starting on July 18, 1994.
   b) For CWB grains and canola starting on August 2, 1994.
   c) A non-refundable fee of $20 per car (no GST) payable to the Receiver General for Canada is required except for Vancouver canola.

   NOTE: The deadline for processing applications for the end of the 1993-94 crop year is July 15, 1994. Any applications received after July 15 will be returned.

2. Each application must be a distinct order - a single grade of grain for a particular station and destination. Please note the following:
   a) For CPS wheats, please indicate whether RED or WHITE to avoid confusion.
   b) If using seed purchase overdelivery privileges, please attach a copy of the Seed Purchase Declaration at time of application.
   c) If you are loading a car at a lease site, please indicate the names of the leasee otherwise it will be assumed that you will be loading on the public or team track.

3. Amendments to applications can only be made prior to allocation and are limited to the following:
   a) changing the week requested.
   b) changing the station and precise siding.
   c) changing the destination of non-Board grains.
   d) changing the administrator with proper approval.
   e) reducing the number of cars applied for.

   NOTE: Producers must have quota at the time of allocation and those wishing to apply in advance of quota must clearly indicate the quota level required:

4. The allocation rules will remain the same as last year:
   a) for non-Board grains, allocation will be based on 10% of the weekly movement in the order received except for canola to Vancouver which must be committed to an export or domestic sale.
   b) for CWB grains, allocation will be based on the grain and grade pattern in your train run and/or station.

5. The back-log rule for non-Board cars will remain the same as last year, where producers are limited to the number of cars they can receive until all other producers who applied at the same time receive their initial car(s). The limits are:
   a) one car per CWB permit holder for rye, flaxseed and canola to Thunder Bay.
   b) two cars per CWB permit holder for NBF wheat, oats and barley.

6. Producers who fail to load their cars within a reasonable time may have their orders cancelled.

7. Producers who ship either infested cars or the wrong grades will be restricted further allocation until such time that they can demonstrate that either the grain is free of infestation or matches the stated grade.

The shipment of your grain must conform to the railway directional shipping restrictions which may be placed on your train run from time to time.

If a backlog on the number of cars of a particular grain to be shipped to a particular destination exists, a producer may not be able to ship more than two cars at a time for oats or for non-Board wheat and barley, and one car for canola destined for Thunder Bay and for rye and flaxseed until all other producers have received their first order.

If at any time you do not require your car(s), please notify the Canadian Grain Commission at once to either cancel or postpone your applications before they are scheduled.

5. If any insect infestation is discovered in a car, the grain may have to be fumigated or destroyed and shipper will be responsible for the costs incurred. Producers will also be restricted from shipping further cars until they submit a sample(s) to the Canadian Grain Commission to demonstrate that their grain is free from infestation.

6. a) Producer cars of damp grain, off-grades or grains likely to go out of condition will only be authorized if a terminal has agreed to unload the grain. Such cars must be billed to the agreed terminal and documented on the I-90 Tag and the bill of lading as "DO NOT POOL". Failure to properly identify such grains and obtain such agreement could result in the return of the grain to the producer at full cost.

   b) Producers who misship grains or grades (the unload grade does not match the grade on the application) may experience delays in the allocation of subsequent cars plus incur additional charges.

II. Producer Checklist For Shipping a Producer Car

1. Applying for the Car

For producer cars that will be totally administered on your behalf by a company, complete and forward the application form (Application for Producer To Obtain Railway Cars) to the head office of the company providing administrative services (See example 1). The administrating company will in turn send it to the Canadian Grain Commission for processing. For self-administered CWB grains, send the application to either the head office of the company acting as consignee (which must also be an agent of the Canadian Wheat

Producers could be liable to all damages resulting from any unevenly loaded or overloaded car that causes a mishap or derailment.

You must ensure that if the car is left unattended that no obstructions, such as ladders or augers which could interfere with car switching, are left attached to the car.

The car must be loaded by the time the railway returns to pick it up. This will be at least eight hours after the time the car is spotted.

3. **Completing the Shipping Documents**

The bill of lading (obtained from the railway or your grain company) must be completed as follows:

Your name or the name of your farm should appear in conjunction with the administrative company on the bill of lading. The document should indicate clearly that the grain is being handled for your account. This will ensure that the title does not change until such time as the grain is unloaded and a receipt has been issued to you. (e.g. XYZ Grain Company for the account of John Doe). The bill of lading should be signed by an authorized railway representative and forwarded to the railway. (See attached examples 4 (CPR) and 5 (CNR).

For shipment to terminal elevators, a Canadian Grain Commission shipping tag (Form I-90) must be completed correctly. You will receive an I-90 tag in the mail along with your authorization letter or from your administrating company. When completed, the tag should be stapled to the notice board on the car (be sure to remove any old tags from both sides of the car).

In the space on the shipping tag (Form I-90) titled "Shipper" you must enter the name of the company to which the grain is consigned as well as your own name, even for self-administered CWB cars. Failure to do so could delay the issuance of official grade and weight documents and the subsequent settlement for your grain. (See attached example 6.)

When the car is loaded and the documentation completed, either you (if self-administered) or your administrative company should notify the railway central to release the car.

If you are self-administering your car, you may require a pre-arranged credit facility with the railway.

(iii) the net weight in tonnes, after dockage, in the "Net Tonnes Delivered" column;

(iv) the total deliveries under that column.

b) Where more than one producer participates in loading wheat or barley in a producer car, the following will apply:

Upon delivery of the grain to that car, each individual producer or principal producer shall, immediately upon completion of the loading of the producer car, make a preliminary entry in each producer's permit book, or books, on the correct page for recording delivery of that grain, showing the information referred to in (a.1) (i) (ii) (iii) and (iv). This entry must represent the gross tonnes the producer contributed to the loading of the car and total of the gross tonne entries of all producers contributing to the loading of the car shall equal the maximum capacity of the producer car.

Immediately on learning of the net weight in tonnes after dockage, each individual producer or principal producer shall complete the entry in that permit book showing the information referred to in (a.2) (i) (ii) (iii) and (iv).

c) Where a producer has received the authorization of the Canadian Grain Commission for the use of a producer railway car or cars, and delivers wheat or barley which has not previously been delivered under a permit book to that car or cars, and the producer has arranged, or is arranging with another person for delivery and sale of the grain, and for payment, the producer shall, immediately upon completion of the delivery, and before making any other deliveries of grain to an elevator or railway car, send the permit book to that other person, who shall make the entries referred to in (a) (1) and (2) above.

Reinspection privileges are extended for 15 days following the unload date reported on the Inspection Certificate returned to you.

Requests for reinspection must be received by the Inspection Division within the 15 day time period. Late requests cannot be honoured as the sample will have been destroyed. Recognizing delays in mail delivery, we will accept telephone calls as a primary request for reinspection. However, a written request to the above address should follow. To ensure proper documentation and handling of your reinspection, one of the following two telephone numbers should be called during regular working hours.

Reinspection Clerk	- (204) 983-3315
Reinspection Officer	- (204) 983-2781

It will be most helpful to have the following information included in your written request and available when making telephone requests:

a) Car Number
b) Unload Date
c) Unload Elevator

9. **Settling a Dispute**

If you have a dispute with the railway, the elevator receiving your grain, or the purchaser of your grain, you are primarily responsible for settling the dispute. However, if you are having trouble obtaining settlement for your grain from a licensee of the Commission, please notify the Commission as soon as possible.

EXAMPLE 1: FULLY ADMINISTERED JOINT C.W.B. APPLICATION

Canadian Grain Commission / Commission canadienne des grains

APPLICATION FOR PRODUCER TO OBTAIN RAILWAY CARS

DEMANDE DU PRODUCTEUR POUR SE PROCURER DES WAGONS

FOR INSTRUCTIONS ON COMPLETING FORM SEE REVERSE SIDE · VOIR AU VERSO LES INSTRUCTIONS SUR LA MANIERE DE REMPLIR CE FORMULAIRE

Section A - Producer Identification (Please Print) Partie A - Identité du producteur (en lettres moulees)

Principal Producer · Producteur principal

Name-Nom: JOHN DOE

Address-Adresse: R.R. 3

City-Ville: SOMEWHERE Province: SASKATCHEWAN

Postal-Code-postal: S0S-S0S Telephone-Téléphone: 306-999-9999

Canadian Wheat Board Identification Number
N° du permis emis par la Commission canadienne du ble

0 0 2 1 3 4 5 6 7 8

Primary Delivery Point · Point de livraison primaire

SOMEWHERE

Secondary Producers · Producteurs secondaires

	1	2	3	4
Name / Nom	HARVEY DOE	HENRY DOE		
CWB Number / N° de la CCB	0 0 2 1 2 3 4 5 6 7	0 0 2 1 2 4 5 6 7 9		

Section B - Application (Please Print) - Partie B - Demande (en lettres moulees)

Grain: BARLEY

Grade Estimate / Grade estimatif: 1 C.W.

Assigned Quota Acres · Nombre d'acres assigne: 80 (A SERIES CONTRACT)

Check Box To indicate if · Cocher la case indiquant s'il s'agit de a

a) C.W.B. / C.C.B. Regular / Reguliere ☐ Contract / Contrat ☒

b) N.B.F. - Fourrage hors commission ☐

No. Of Cars Required / Nbre de wagons demandes: 2

Week Preferred For Shipment / Choix de semaine d'expedition: WEEK 17

Placement of Cars / Emplacement des wagons

Shipping Point And Railway / Point d'expedition et voie ferree: SOMEWHERE

Precise Siding And Placement On Siding / Voie de service et endroit precis sur la voie: NORTH OF POOL

Destination Of Shipment / Destination de l'expedition

City / Ville: THUNDER BAY

Elevator / Silo: POOLABLE

Section C - Declaration - Partie C - Declaration

I. The Undersigned Do Hereby Solemnly Declare

1. That all of the information contained in section A and B of this application is true and correct
2. That the grain can and will be loaded into the car(s) applied for within the limitations of my quota
3. That if the siding named in section B is not a public siding I have obtained the permission of the owner to use the siding
4. That I am prepared to load either box cars or hopper cars
5. That the car(s) will not be loaded through a licensed elevator
6. That the car(s) will be loaded by the time the railway returns to pick it up
7. That I will complete and return a Canadian Grain Commission Shipping Report

Je soussigne declare sur l'honneur que

1. Tous les renseignements fournis dans les parties A et B de cette demande sont exacts et veridiques
2. Le grain peut être charge et sera charge dans le(s) wagon(s) qui a (ont) ete demande(s) dans les limites de mon contingent
3. La voie de service nommee a la partie B n'etant pas une voie publique j'ai obtenu la permission du proprietaire de m'en servir
4. Je suis prêt a charger le grain soit sur un wagon couvert ou un wagon-tremie
5. Ce(s) wagon(s) ne sera (seront) pas charge(s) par l'entremise d'un silo agree
6. Le chargement du (des) wagon(s) sera termine au moment ou la compagnie de chemin de fer vient reprendre ledit (lesdit(s) wagon(s)
7. Je remplirai et remettrai a la Commission canadienne des grains un rapport d'expedition

Applicant's signature-Signature du requerant

JULY 23, 1991
Date

Section D - Administrator And Consignee · Partie D - Administrateur et consignataire

XYZ GRAIN COMPANY
Name of Administrator/Nom de l'administrateur

Authorized Signature/Signature autorisee

XYZ GRAIN COMPANY
Name Of Consignee/Nom du consignataire

Authorized Signature/Signature autorisee

The information you provide on this document is collected by (for) Agriculture Canada under the authority of the Canada Grain Act for the purpose of allocating railcars to grain producers
Les renseignements que vous fournissez dans le present document sont recueillis par (pour) Agriculture Canada en vertu de la Loi sur les grains du Canada afin d'attribuer des wagons chemin de fer aux producteurs de cereales

Personal information will be protected under the provisions of the Privacy Act.
Les renseignements personnels seront proteges en vertu de la Loi sur la protection des renseignements personnels.

Personal information that you provide about another individual may be accessible to him or her under the Privacy Act.
Les renseignements personnels que vous fournissez au sujet d'un autre particulier peuvent être accessibles a ce dernier aux termes de la Loi sur la protection des renseignements personnels.

Personal information will be stored in Personal Information Bank AGR P-P4-205
Les renseignements personnels seront verses au Fichier de renseignements personnels AGR P-P4-205

Information that could cause you or your organization injury if released is protected from disclosure as defined in section 20 of the Access to Information Act.
Les renseignements qui pourraient porter préjudice a votre interet ou a celui de votre organisation s'ils etaient divulgues sont proteges aux termes de l'article 20 de la Loi sur l'acces a l'information.

Some information may be accessible or protected as required under the provisions of the Access to Information Act.
Certains renseignements peuvent être accessibles ou proteges selon ce que prescrit la Loi sur l'acces a l'information.

Canada

CANADIAN GRAIN COMMISSION COPY — COPIE DE LA COMMISSION CANADIENNE DES GRAINS

AGR 1765 (90-12)

EXAMPLE 3: SELF ADMINISTERED C.W.B. APPLICATION

Canadian Grain Commission / Commission canadienne des grains

APPLICATION FOR PRODUCER TO OBTAIN RAILWAY CARS

DEMANDE DU PRODUCTEUR POUR SE PROCURER DES WAGONS

FOR INSTRUCTIONS ON COMPLETING FORM SEE REVERSE SIDE - VOIR AU VERSO LES INSTRUCTIONS SUR LA MANIERE DE REMPLIR CE FORMULAIRE

Section A - Producer Identification (Please Print) Partie A - Identité du producteur (en lettres moulees)

Principal Producer - Producteur principal

Name-Nom: JOHN DOE

Address-Adresse: R.R. 3

City-Ville: SOMEWHERE Province: SASKATCHEWAN

Postal-Code-postal: S0S-S0S Telephone-Telephone: 306-999-9999

Canadian Wheat Board Identification Number
N° du permis emis par la Commission canadienne du ble

0 0 2 1 3 4 5 6 7 8

Primary Delivery Point - Point de livraison primaire

SOMEWHERE

Secondary Producers - Producteurs secondaires

Name Nom	1	2	3	4
CWB Number N° de la CCB				

Section B - Application (Please Print) - Partie B - Demande (en lettres moulees)

Grain: WHEAT

Grade Estimate / Grade estimatif: 2 CWRS

Assigned Quota Acres - Nombre d'acres assigne: 756 - (B Quota)

Check Box To Indicate If - Cocher la case indiquant s'il s'agit de la

a) C W B / C C B Regular / Reguliere [X] Contract / Contrat [ ]

b) N B F - Fourrage hors commission [ ]

No. Of Cars Required / Nbre de wagons demandes:

Week Preferred For Shipment / Choix de semaine d'expedition: 16 OR ASAP AFTER QUOTA OPENS

Placement of Cars / Emplacement des wagons

Shipping Point And Railway / Point d'expedition et voie ferree: SOMEWHERE

Precise Siding And Placement On Siding / Voie de service et endroit precis sur la voie: NORTH OF POOL

Destination Of Shipment / Destination de l'expedition

City / Ville: THUNDER BAY

Elevator / Silo: POOLABLE

Section C - Declaration - Partie C - Declaration

I, The Undersigned Do Hereby Solemnly Declare

1 That all of the information contained in section A and B of this application is true and correct

2 That the grain can and will be loaded into the car(s) applied for within the limitations of my quota

3 That if the siding named in section B is not a public siding I have obtained the permission of the owner to use the siding

4 That I am prepared to load either box cars or hopper cars

5 That the car(s) will not be loaded through a licensed elevator

6 That the car(s) will be loaded by the time the railway returns to pick it up

7 That I will complete and return a Canadian Grain Commission Shipping Report

Je soussigne declare sur l'honneur que

1 Tous les renseignements fournis dans les parties A et B de cette demande sont exacts et veridiques

2 Le grain peut être charge et sera charge dans le(s) wagon(s) qui a (ont) ete demande(s) dans les limites de mon contingent

3 La voie de service nommee a la partie B n'etant pas une voie publique j'ai obtenu la permission du proprietaire de m'en servir

4 Je suis prêt a charger le grain soit sur un wagon couvert ou un wagon-tremie

5 Le(s) wagon(s) ne sera (seront) pas charge(s) par l'entremise d'un silo agree

6 Le chargement du (des) wagon(s) sera termine au moment ou la compagnie de chemin de fer vient reprendre ledit (lesdit(s)) wagon(s)

7 Je remplirai et remettrai a la Commission canadienne des grains un rapport d'expedition

Applicant's signature-Signature du requerant: JOHN DOE

Date: JULY 23, 1991

Section D - Administrator And Consignee - Partie D - Administrateur et consignataire

Name of Administrator/Nom de l'administrateur: SELF ADMINISTERED

Name Of Consignee-Nom du consignataire: XYZ GRAIN COMPANY

Authorized Signature/Signature autorisee

Authorized Signature/Signature autorisée

The information you provide on this document is collected by (for) Agriculture Canada under the authority of the Canada Grain Act for the purpose of allocating railcars to grain producers
Les renseignements que vous fournissez dans le present document sont recueillis par (pour) Agriculture Canada en vertu de la Loi sur les grains du Canada afin d'attribuer des wagons chemin de fer aux producteurs de cereales

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Les renseignements personnels que vous fournissez au sujet d'un autre particulier peuvent être accessibles a ce dernier aux termes de la Loi sur la protection des renseignements personnels.

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Certains renseignements peuvent etre accessibles ou proteges selon ce que prescrit la Loi sur l'acces a l'information.

Canada

CANADIAN GRAIN COMMISSION COPY — COPIE DE LA COMMISSION CANADIENNE DES GRAINS

AGR 1766 (90-12)

TERMS AND CONDITIONS SET FORTH HEREIN ARE PRESCRIBED BY THE BOARD OF TRANSPORT COMMISSIONERS FOR CANADA BY ITS GENERAL ORDER NO. " S DATED FEBRUARY " 1985

RECEIVED SUBJECT TO THE CLASSIFICATION AND TARIFFS IN EFFECT ON THE DATE OF ISSUE OF THE ORIGINAL BILL OF LADING GOODS DESCRIBED BELOW IN APPARENT GOOD ORDER EXCEPT AS NOTE CONTENTS AND CONDITIONS OF CONTENTS OF PACKAGES UNKNOWN MARKED CONSIGNED AN DESTINED AS INDICATED BELOW WHICH SAID COMPANY AGREES TO CARRY TO "S USUAL PLACE DELIVERY AT SAID DESTINATION IF ON ITS ROAD OTHERWISE TO DELIVER TO ANOTHER CARRIER ON ROUTE TO SAID DESTINATION IT S MUTUALLY AGREED AS TO EACH CARRIER OF ALL OR ANY OF GOODS OVER ALL OR ANY PORTION OF SAID ROUTE TO DESTINATION AND AS TO EACH PARTY AT ANY INTERESTED IN ALL OR ANY OF SAID GOODS THAT EVERY SERVICE TO BE PERFORMED HEREUNDER SHA BE SUBJECT TO ALL THE TERMS AND CONDITIONS SEVERALLY FULLY AND SPECIFICALLY SET FORTH HERE APPROVED BY THE BOARD OF TRANSPORT COMMISSIONERS FOR CANADA BY GENERAL ORDER NO DATED FEBRUARY " 1985 SET FORTH IN THE CANADIAN FREIGHT CLASSIFICATION AND ALSO AVAILAB ALL RAILWAY AGENCY STATIONS AND FREIGHT OFFICES UPON REQUEST WHEN SAID GOODS ARE CA BY A RAIL CARRIER AND WHICH ARE AGREED TO BY THE SHIPPER AND ACCEPTED FOR HIMSELF AND H SIGNS

CANADIAN NATIONAL RAILWAYS

STRAIGHT BILL OF LADING

ORIGINAL — NOT NEGOTIABLE

CN 7000-E
(5-82)
48-48-002

EXAMPLE 5: SELF ADMINISTERED CWB

CAR INITIAL	CAR NUMBER	NO OF CAR	DATE	FOR CARRIER S USE
CNWX	400001	H	NOV. 12,	WAYBILL NUMBER

STOP THIS CAR IN TRANSIT — NAME AND ADDRESS OF PARTY AT STOP OFF POINT

AT

AT — STOP OFF IF ANY

XYZ GRAIN COMPANY — CONSIGNED TO (PLEASE PRINT)

WINNIPEG (CITY PLEASE PRINT) MANITOBA (PROV /STATE) — MAIL ADDRESS — SHIPPER NUMBER

THUNDER BAY (PLEASE PRINT) ONTARIO — FINAL DESTINATION — SOMEWHERE — STATION FROM

C.N. RAIL — ROUTE — JOHN DOE — SHIPPER

SHIPPER S INSTRUCTIONS REGARDING PERISHABLE PROTECTIVE SERVICE MILLING WEIGHING ETC SPECIFY TO WHOM CHARGEABLE

DEPOSIT AT SASKATCHEWAN WHEAT POOL TERMINAL — R.R. 3 SOMEWHERE, SASKATCHEWAN — ACCOUNT TO BE MAILED C

LENGTH OF CAR ORDERED | MARKED CAPACITY OF CAR ORDERED | CHARGES ARE TO BE PREPAID WRITE ON S AND HERE TO BE PREPAID: PREPAID

NO OF PACKAGES	DESCRIPTION OF ARTICLES AND SPECIAL MARKS	R W C No	KILOGRAMS (SUBJECT TO CORRECTION)	✓	WEIGHT IN POUNDS (SUBJECT TO CORRECTION)
	BULK WHEAT 2CWRS		70 000		
	HARVESTED IN CANADA				
	POOLABLE				
	WEEK 15 / AUTHORIZATION NUMBERS				
	SEAL NUMBERS				

RECEIVED $ _____ TO APPLY IN PREPAYMENT OF THE CHARGES ON THE PROPERTY DESCRIBED HEREON

AGENT _____ PER _____
OR CASHIER — THIS SIGNATURE HERE ACKNOWLEDGES ONLY THE AMOUNT PREPAID

CHARGES ADVANCED

$ _____

SHIPPER JOHN DOE

PER SIGNATURE

AGENT _____

PER _____

(THIS BILL OF LADING IS TO BE SIGNED BY THE SHIPPER AND AGENT OF THE CARRIER ISSUING SAME)

EXAMPLE 7

Canadian Grain Commission / Commission canadienne des grains

Producer Car Shipping Report
Rapport d'expédition de(s) wagon(s) du producteur

CANADIAN WHEAT BOARD ID. NUMBER
N° D'IDENTIFICATION DE LA CCB: 0021345678

SHIPPING POINT
POINT D'EXPÉDITION: SOMEWHERE

DATE CARS SPOTTED
DATE DE MISE EN PLACE DES WAGONS: NOV. 12

CONSIGNEE/CONSIGNATAIRE: XYZ COMPANY

DESTINATION: THUNDER BAY

GRAIN/GRADE: WHEAT 2CWRS

	AUTHORIZATION NUMBER(S) NUMÉRO D'AUTORISATION	RAILWAY CAR NUMBER NUMÉRO DU WAGON	ESTIMATED WEIGHT POIDS APPROXIMATIF
1.	100Z	CNWX 100001	70 TONNES
2.			
3.			
4.			
5.			
6.			
7.			

NOV. 13
DATE

J. Doe
SIGNATURE

NOTE: Failure to return this report to the Canadian Grain Commission may cause unnecessary delay in the settlement of your producer cars

NOTA: Omettre de retourner ce rapport à la Commission canadienne des grains pourrait entraîner des retards inutiles au règlement de vos wagons de producteurs.

29/06/88

Appendix IV

SCHEDULE VII
(Sections 32 and 37)

MAXIMUM TARIFF - LICENSED PRIMARY ELEVATORS
(Effective August 1, 1994)

Item	Column I Service	Column II Basis	Column III Rate ($)
1.	Elevation		
	(1) Receiving, elevating and loading out		
	(a) wheat (including durum)	per tonne	10.75
	(b) oats	per tonne	17.63
	(c) barley	per tonne	13.33
	(d) rye	per tonne	11.29
	(e) flaxseed	per tonne	16.92
	(f) Canola, rapeseed or mustard seed	per tonne	17.20
	(g) corn	per tonne	11.83
	(h) sunflower seed	per tonne	38.13
	(i) soybeans or peas	per tonne	14.34
	(j) other grains or screenings	per tonne	17.63
	(2) Additional charges		
	(a) removal of dockage (terminal cleaning)		
	(i) wheat (including durum)	per tonne	3.11
	(ii) oats	per tonne	5.09
	(iii) barley	per tonne	3.85
	(iv) rye	per tonne	3.26
	(v) flaxseed	per tonne	4.89
	(vi) Canola, rapeseed or mustard seed	per tonne	4.97
	(vii) corn	per tonne	3.42
	(viii) sunflower seed	per tonne	11.02
	(ix) soybeans or peas	per tonne	4.14
	(x) other grains or screenings	per tonne	5.09
	(b) administration of consigned cars	per car	69.50

SCHEDULE VII -- Continued

MAXIMUM TARIFF - LICENSED PRIMARY ELEVATORS -- Continued

Item	Column I Service	Column II Basis	Column III Rate ($)
2.	Storage		
	(1) With respect to primary elevator receipts and interim elevator receipts, for each succeeding day or part thereof after the first 10 days, excluding the day on which the storage period ends,		
	(a) wheat (including durum)	per tonne	0.038
	(b) oats	per tonne	0.061
	(c) barley	per tonne	0.047
	(d) rye	per tonne	0.040
	(e) flaxseed	per tonne	0.044
	(f) Canola, rapeseed or mustard seed	per tonne	0.045
	(g) corn	per tonne	0.041
	(h) sunflower seed	per tonne	0.100
	(i) soybeans or peas	per tonne	0.038
	(j) other grains or screenings	per tonne	0.061
	(2) With respect to all other storage, for each day or part thereof, excluding the day on which the storage period ends,		
	(a) wheat (including durum)	per tonne	0.038
	(b) oats	per tonne	0.061
	(c) barley	per tonne	0.047
	(d) rye	per tonne	0.040
	(e) flaxseed	per tonne	0.044
	(f) Canola, rapeseed or mustard seed	per tonne	0.045
	(g) corn	per tonne	0.041
	(h) sunflower seed	per tonne	0.100
	(i) soybeans or peas	per tonne	0.038
	(j) other grains or screenings	per tonne	0.061

SCHEDULE VII -- Continued

MAXIMUM TARIFF - LICENSED PRIMARY ELEVATORS -- Continued

Item	Column I Service	Column II Basis	Column III Rate ($)
3.	Cleaning as requested by the owner of the grain or screenings		
	(1) With respect to grain or screenings returned to the owner (including receiving, elevating and loading out)		
	(a) wheat (including durum)	per tonne	13.86
	(b) oats	per tonne	22.72
	(c) barley	per tonne	17.18
	(d) rye	per tonne	14.55
	(e) flaxseed	per tonne	21.81
	(f) Canola, rapeseed or mustard seed	per tonne	22.17
	(g) corn	per tonne	15.25
	(h) sunflower seed	per tonne	49.15
	(i) soybeans or peas	per tonne	18.48
	(j) other grains or screenings	per tonne	22.72
	(2) With respect to grain or screenings not returned to the owner		
	(a) wheat (including durum)	per tonne	3.11
	(b) oats	per tonne	5.09
	(c) barley	per tonne	3.85
	(d) rye	per tonne	3.26
	(e) flaxseed	per tonne	4.89
	(f) Canola, rapeseed or mustard seed	per tonne	4.97
	(g) corn	per tonne	3.42
	(h) sunflower seed	per tonne	11.02
	(i) soybeans or peas	per tonne	4.14
	(j) other grains or screenings	per tonne	5.09

Appendix V

Trucking Rates In Saskatchewan, 1995

Miles	Rate Per Tonne	Increase Per Tonne
0-15	4.20	--
16-30	4.85	0.65
31-40	5.65	0.80
41-50	6.30	0.65
51-60	6.90	0.60
61-70	7.70	0.80
71-80	8.50	0.80
81-90	9.10	0.60
91-100	9.65	0.55

Based on the above trucking rates, one can see that:

(a) the rate of increase in the cost per tonne escalates up to 40 miles,

(b) the rate of increase in the cost per tonne decreases between 40 and 60 miles,

(c) the rate of increase in the cost per tonne is the same for 61-70 miles and 71-80 miles, and

(d) the rate of increase in the cost per tonne declines after 80 miles.

From these figures, we can conclude:

(a) the company must charge a higher fee for trips less than 41 miles to offset the costs associated with time spent loading, unloading and completing forms,

(b) the company can offer some incentives between 40 and 60 miles as the major costs have already been incurred in the first 40 miles,

(c) between 61 and 80 miles, the company experiences additional costs associated with the time involved in travel.

(d) beyond 80 miles, the additional expenses incurred by the company on a per tonne are diminishing.

Example of calculation of short and long haul revenues.

Let us compare a 30 mile round trip to a 90 mile round trip. Assume it takes in total one hour to load, unload and complete the necessary papers. Driving is at 60 miles per hour. Then, a 30 mile trip takes 1.5 hours while a 90 mile trip takes 2.5 hours.

In a 7.5 hour work day, the truck could haul the equivalent of five 30 mile trips or three 90 mile trips. If the revenue from the 90 mile trip is $9.10 per tonne and the fee for a 30 mile trip is $4.85 per tonne, then what rate would the company have to charge for a short haul to be indifferent between a long or short haul?

The potential daily revenue from three 90 mile trips would be $27.30/tonne (3 x $9.10/tonne). To equal this revenue, the fee per 30 mile trip would have to be $27.30 divided by 5 trips or $5.46/tonne.

Often companies charge an extra fee for short distances. In this example, the extra fee would be the difference between $5.46/tonne and $4.85/tonne or $0.61/tonne.